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PROCEEDINGS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION

AT THE

FORTY-THIRD ANNUAL MEETING,

HELD AT

DENVER, COLORADO, AUGUST, 1895.

ALSO THE

CONSTITUTION, BY-LAWS AND ROLL OF MEMBERS.

BALTIMORE:
PUBLISHED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION.
1895.

Medical
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(DECEASED IN ITALICS.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice Presidents.
Oct. 6, 1852..	Philadelphia, Pa....	*Daniel B. Smith*, Philadelphia.	*George W. Andrews*, Baltimore.	*Samuel M. Colcord*, Boston.	*C. Augustus Smith*, Cincinnati.
Aug. 24, 1853..	Boston, Mass.....	*William A. Brewer*, Boston.	*George D. Coggeshall*, New York.	*Alexander Duval*, Richmond, Va.	Charles B. Guthrie, Memphis, Tenn.
July 25, 1854..	Cincinnati, O.....	*William B. Chapman*, Cincinnati.	Henry T. Cummings, Portland, Me.	*John Meakim*, New York.	*Joseph Laidley*, Richmond, Va.
Sept. 11, 1855..	New York, N. Y....	*John Meakim*, New York.	Charles B. Guthrie, Memphis, Tenn.	*Charles Ellis*, Philadelphia.	*Henry F. Fish*, Waterbury, Conn.
Sept. 9, 1856..	Baltimore, Md.....	*George W. Andrews*, Baltimore.	*John L. Kidwell*, Washington, D. C.	Frederick Stearns, Detroit, Mich.	*Henry T. Kiersted*, New York, N. Y.
Sept. 8, 1857..	Philadelphia, Pa. ...	*Charles Ellis*, Philadelphia.	*James Cooke*, Fredericksburg, Va.	*Samuel P. Peck*, Bennington, Vt.	A. E. Richards, Plaquemine, La.
Sept. 14, 1858..	Washington, D. C...	*John L. Kidwell*, Georgetown, D. C.	Edward R. Squibb, Brooklyn, N. Y.	*James O'Gallagher*, St. Louis.	Robert Battey, Rome, Ga.
Sept. 13, 1859..	Boston, Mass.....	*Samuel M. Colcord*, Boston.	*William Procter, Jr.*, Philadelphia.	*Joseph Roberts*, Baltimore.	Edwin O. Gale, Chicago.
Sept. 11, 1860..	New York, N. Y....	*Henry T. Kiersted*, New York.	William J. M. Gordon, Cincinnati.	*William S. Thompson*, Baltimore.	*Theodore Metcalf*, Boston.
Aug. 27, 1862..	Philadelphia, Pa. ...	*William Procter, Jr.*, Philadelphia.	*John Milhau*, New York.	*Eugene L. Massol*, St. Louis.	*J. Faris Moore*, Baltimore.
Sept. 8, 1863..	Baltimore, Md.....	*J. Faris Moore*, Baltimore.	*John M. Maisch*, Philadelphia.	Chas. A. Tufts, Dover, N. H.	*George W. Weyman*, Pittsburgh.
Sept. 21, 1864..	Cincinnati, O.....	William J. M Gordon, Cincinnati.	*Richard H. Stabler*, Alexandria, Va.	Enno Sander, St. Louis.	*Thomas Hollis*, Boston.

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Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Sept. 5, 1865..	Boston, Mass.....	*Henry W. Lincoln*, Boston.	*George C. Close*, Brooklyn, N. Y.	*Elijah W. Sackrider*, Cleveland, O.	Charles A. Heinitsh, Lancaster, Pa.
Aug. 22, 1866..	Detroit, Mich.....	Frederick Stearns, Detroit, Mich.	*Edward Parrish*, Philadelphia.	Ezekiel H. Sargent, Chicago.	*John W. Shedden*, New York.
Sept. 10, 1867..	New York, N. Y.....	*John Milhau*, New York.	Robert J. Brown, Leavenworth, Kan.	N. Hynson Jennings, Baltimore.	*Daniel Henchman*, Boston.
Sept. 8, 1868..	Philadelphia, Pa....	*Edward Parrish*, Philadelphia.	*Ferris Bringhurst*, Wilmington, Del.	*Edward S. Wayne*, Cincinnati.	Albert E. Ebert, Chicago.
Sept. 7, 1869..	Chicago, Ill.....	Ezekiel H. Sargent, Chicago.	Ferdinand W. Sennewald, St. Louis.	*John H. Pope*, New Orleans.	Joel S. Orne, Cambridgeport, Mass.
Sept. 13, 1870..	Baltimore, Md.....	*Richard H. Stabler*. Alexandria, Va.	Fleming G. Grieve, Milledgeville, Ga.	James G. Steele, San Francisco.	*Eugene L. Massot*, St. Louis.
Sept. 12, 1871..	St. Louis, Mo	Enno Sander, St. Louis.	C. Lewis Diehl, Louisville, Ky.	George F. H. Markoe, Boston.	Matthew F. Ash, Jackson, Miss.
Sept. 3, 1872..	Cleveland, O.	Albert E. Ebert, Chicago.	*Samuel S. Garrigues*, East Saginaw, Mich.	Edward P. Nichols, Newark, N. J.	*Henry C. Gaylord*, Cleveland, O.
Sept. 16, 1873..	Richmond, Va.....	John F. Hancock, Baltimore.	William Saunders, London, Ont.	John T. Buck, Jackson, Miss.	*Paul Balluff*, New York.
Sept. 8, 1874..	Louisville, Ky.....	C. Lewis Diehl, Louisville, Ky.	*Joseph Roberts*, Baltimore.	William T. Wenzell, San Francisco.	Augustus R. Bayley, Cambridgeport, Mass.
Sept. 7, 1875..	Boston, Mass.....	George F. H. Markoe, Boston.	Frederick Hoffmann, New York.	T. Roberts Baker, Richmond, Va.	Christian F. G. Meyer, St. Louis.
Sept. 12, 1876..	Philadelphia, Pa....	Charles Bullock, Philadelphia.	Samuel A. D. Sheppard, Boston.	*Gustavus J. Luhn*, Charleston, S. C.	*Jacob D. Wells*, Cincinnati.
Sept. 4, 1877..	Toronto, Can.....	William Saunders, London, Ont.	Ewen McIntyre, New York.	John Ingalls, Macon, Ga.	*Emlen Painter*, San Francisco.

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Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Nov. 26, 1878..	Atlanta, Ga.....	*Gustavus J. Luhn*, Charleston, S. C.	*Frederick T. Whiting*, Great Barrington, Mass.	Henry J. Rose, Toronto, Can.	*William H. Crawford*, St. Louis.
Sept. 9, 1879..	Indianapolis, Ind. ..	George W. Sloan, Indianapolis, Ind.	T. Roberts Baker, Richmond, Va.	Joseph L. Lemberger, Lebanon, Pa.	Philip C. Candidus, Mobile, Ala.
Sept. 14, 1880..	Saratoga, N. Y.	James T. Shinn, Philadelphia.	George H. Schafer, Fort Madison, Ia.	William S. Thompson, Washington, D. C.	William Simpson, Raleigh, N. C.
Aug. 23, 1881..	Kansas City, Mo....	*P. Wendover Bedford*, New York.	*Emlen Painter*, San Francisco.	George Leis, Lawrence, Kan.	*John F. Judge*, Cincinnati.
Sept. 12, 1882..	Niagara Falls, N. Y..	Charles A. Heinitsh, Lancaster, Pa.	John Ingalls, Macon, Ga.	Louis Dohme, Baltimore.	*William B. Blanding*, Providence, R. I.
Sept. 11, 1883..	Washington, D. C...	William S. Thompson, Washington, D. C.	Charles Rice, New York.	*Frederick H. Masi*, Norfolk, Va.	Edward W. Runyon, San Francisco.
Aug. 26, 1884..	Milwaukee, Wis	John Ingalls, Macon, Ga.	*John A. Dadd*, Milwaukee, Wis.	Henry Canning, Boston, Mass.	*Charles F. Goodman*, Omaha, Neb.
Sept. 8, 1885..	Pittsburgh, Pa.....	*Joseph Roberts*, Baltimore, Md.	Albert H. Hollister, Madison, Wis.	Albert B. Prescott, Ann Arbor, Mich.	Joseph S. Evans, West Chester, Pa.
Sept. 7, 1886..	Providence, R. I....	Chas. A. Tufts, Dover, N. H.	*Henry J. Menninger*, Brooklyn, N. Y.	M. W. Alexander, St. Louis, Mo.	Norman A. Kuhn, Omaha, Neb.
Sept. 5, 1887..	Cincinnati, O.....	John U. Lloyd, Cincinnati, O.	M. W. Alexander, St. Louis, Mo.	A. K. Finlay, New Orleans, La.	Karl Simmon, St. Paul, Minn.
Sept. 3, 1888..	Detroit, Mich	M. W. Alexander, St. Louis, Mo.	Jas. Vernor, Detroit, Mich.	Fred. Wilcox, Waterbury, Conn.	Alvin A. Yeager, Knoxville, Tenn.
June 24, 1889..	San Francisco, Cal..	*Emlen Painter*, New York.	Karl Simmon, St. Paul, Minn.	Wm. M. Searby, San Francisco.	Jos. W. Eckford, Aberdeen, Miss.
Sept. 8, 1890..	Old Pt. Comfort, Va.	A. B. Taylor, Philadelphia.	A. B. Stevens, Ann Arbor, Mich.	Chas. E. Dohme, Baltimore, Md.	Jas. M. Good, St. Louis, Mo.

LIST OF OFFICERS (Concluded).

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
April 27, 1891..	New Orleans, La....	A. K. Finlay, New Orleans, La.	Geo. J. Seabury, New York, N. Y.	W. H. Torbert, Dubuque, Ia.	L. T. Dunning, Sioux Falls, S. Dak.
July 14, 1892..	Profile House, N. H.	Jos. P. Remington, Philadelphia.	A. P. Preston, Portsmouth, N. H.	Sidney P. Watson, Atlanta, Ga.	Wm. H. Averill, Frankfort, Ky.
Aug. 14, 1893..	Chicago, Ill.....	Edgar L. Patch, Boston.	Leo Eliel, South Bend, Ind.	Wiley Rogers, Louisville, Ky.	Chas. Caspari, Jr., Baltimore, Md.
Sept. 3, 1894..	Asheville, N. C.	William Simpson, Raleigh, N. C.	Chas. M. Ford, Denver, Colo.	Jno. N. Hurty, Indianapolis, Ind.	Jos. E. Morrison, Montreal, Can.
Aug. 14, 1895..	Denver, Colo.	James M. Good, St. Louis, Mo.	Chas. E. Dohme, Baltimore, Md.	Adolph Brandenberger, Jefferson City, Mo.	Mrs. M. O. Miner, Hiawatha, Kans.

TREASURERS.

Alfred B. Taylor, Philadelphia, 1852–54.
Samuel M. Colcord, Boston, 1854–56, and 1857–59.
James S. Aspinwall, New York, 1856–57.
Ashel Boyden, Boston, 1859–60.
Henry Haviland, New York, 1860–63.
J. Brown Baxley, Baltimore, 1863–65.
Charles A. Tufts, Dover, N. H., 1865–86.
Samuel A. D. Sheppard, Boston, 1886–96.

RECORDING SECRETARIES.

George D. Coggeshall, New York, 1852–53.
Edward Parrish, Philadelphia, 1853–54.
Edward S. Wayne, Cincinnati, 1854–55.
William J. M. Gordon, Cincinnati, 1855–59.
Charles Bullock, Philadelphia, 1859–60.
James T. Shinn, Philadelphia, 1860–62.
Peter W. Bedford, New York, 1862–63.
William Evans, Jr., Philadelphia, 1863–64.
Henry N. Rittenhouse, Philadelphia, 1864–65.
H. M. Whelpley, St. Louis, 1893.

CORRESPONDING SECRETARIES.

William Procter, Jr., 1852–53, and 1854–57.
William B. Chapman, Cincinnati, 1853–54.
Edward Parrish, Philadelphia, 1857–58.
Ambrose Smith, Philadelphia, 1858–59.
William Hegeman, New York, 1859–60.
Peter W. Bedford, New York, 1860–62, and 1863–65.
John M. Maisch, Philadelphia, 1862–63.

PERMANENT SECRETARIES.

John M. Maisch, Philadelphia, 1865–Sept., 1893.

Henry M. Whelpley, St. Louis (acting), August, 1893.

Joseph P. Remington, Philadelphia, 1893–94.

Chas. Caspari, Jr., Baltimore, 1894–

LOCAL SECRETARIES.

For the meeting held in		For the meeting held in		For the meeting held in	
1867....	*P. Wendover Bedford.*	1877....	Henry J. Rose.	1887....	George W. Voss.
1868....	Alfred B. Taylor.	1878....	*Jesse W. Rankin.*	1888....	James Vernor.
1869....	*Henry W. Fuller.*	1879....	Eli Lilly.	1889....	Edward W. Runyon.
1870....	*J. Faris Moore.*	1880....	Charles F. Fish.	1890....	Charles E. Dohme.
1871....	*William H. Crawford.*	1881....	William T. Ford.	1891....	A. K. Finlay.
1872....	*Henry C. Gaylord.*	1882....	*Hiram E. Griffith.*	1892....	H. M. Whitney.
1873....	Thomas H. Hazard.	1883....	Charles Becker.	1893....	Henry Biroth.
1874....	Emil Scheffer.	1884....	Henry C. Schranck.	1894....	W. G. Smith.
1875....	Samuel A. D. Sheppard.	1885....	George A. Kelly.	1895....	Edm. L. Scholtz.
1876....	Adolphus W. Miller.	1886....	*William B. Blanding.*	1896....	Joseph E. Morrison.

REPORTERS ON PROGRESS OF PHARMACY.

C. L. Diehl, Louisville, Ky., 1873–91, and 1895–96.

Chas. Rice, New York, N. Y., 1891–92.

Henry Kraemer, New York, N. Y., 1892–95.

AUTHORIZED AGENTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Appointed by the President in compliance with the following resolutions:

Resolved, That the President be directed to appoint authorized agents, where needed in the different States, for the collection of dues, distribution of the Proceedings, etc.; such agents to be designated by the Treasurer and Permanent Secretary of the Association, and a list of the agents to be published in the Proceedings. (Passed at Baltimore, 1870.)

Resolved, That the President of this Association be requested to appoint, in every locality where more than three members reside, a local agent, whose duty it shall be to aid the Treasurer in the collection of members' dues in his section, and to procure new members by placing before the pharmacists, and others eligible to membership, the grea advantages that they will derive from associating themselves with this body. (Passed at Indianapolis, 1879.)

Resolved, That whilst it is desirable that the authorized agents shall at all times render their accounts as promptly as convenient, it is especially to be desired that they render a complete account to the Treasurer of such moneys as are in their hands on the first day of August and December in each year, in order that the Treasurer may be able to make his yearly accounts as full as possible. (Passed by Council, 1883.)

Alabama,	Chas. A. Mohr,	Mobile.
Arkansas,	John B. Bond, Main and Fifth streets,	Little Rock.
	William L. Dewoody,	Pine Bluff.
California,	William T. Wenzell, 322 Polk street,	San Francisco.
	George B. Flint, 1101 Broadway,	Oakland.
Colorado,	Edmund L. Scholtz, Sixteenth & Stout streets,	Denver.
Dist. of Columbia,	Walter G. Duckett, 22d st. and Penna. ave.,	Washington.
Connecticut,	John K. Williams, 391 Main street,	Hartford.
	Warren A. Spalding, 19 Church street,	New Haven.
Delaware,	Linton Smith, Church and Bennett streets,	Wilmington.
Florida,	William Aird, Maggie & E. Brough streets,	Jacksonville.
	Sydney B. Leonardi, Franklin st.,	Tampa.
Georgia,	John P. Turner,	Columbus.
	Robert H. Land, 812 Broad street,	Augusta.
	John Ingalls, Fourth and Poplar streets,	Macon.
Illinois,	David G. Plummer, 6 Main street,	Bradford.
	C. S. N. Hallberg, 358 Dearborn street,	Chicago.
	Charles Zimmerman, 423 S. Adams street,	Peoria.
Indiana,	Henry J. Schlaepfer, Second and Main streets,	Evansville.
	George W. Sloan, 22 W. Washington street,	Indianapolis.
	Jacob Baur, 701 Wabash avenue,	Terre Haute.

Iowa,	John W. Ballard, 106 West Second street,	Davenport.
	Theodore W. Ruete, 568 Main street,	Dubuque.
	George H. Schafer, 713 Front street,	Fort Madison.
	Silas H. Moore, 80 Fourth street,	Sioux City.
Kansas,	George Leis, 747 Massachusetts street,	Lawrence.
	Robert J. Brown, 113 Delaware street,	Leavenworth.
Kentucky,	George A. Zwick, Eleventh st. and Madison ave.,	Covington.
	William H. Averill, 435 Main street,	Frankfort.
	C. Lewis Diehl, Third street and Broadway,	Louisville.
Louisiana,	Alexander K. Finlay, 186 Camp street,	New Orleans.
Maine,	Noah S. Harlow, 4 Smith's Block,	Bangor.
	Henry H. Hay, Free and Middle sts.,	Portland.
Maryland,	D. M. R. Culbreth, 203 E. Preston street,	Baltimore.
	Thomas W. Shryer, 111 Baltimore street,	Cumberland.
Massachusetts,	S. A. D. Sheppard, 1129 Washington street,	Boston.
	Joel S. Orne, 493 Main street,	Cambridgeport.
	B. Frank Stacey, Thompson Square,	Charlestown.
	Freeman H. Butler, 141 Central street,	Lowell.
	James E. Blake, 64 North Second street,	New Bedford.
	John H. Manning, 51 North street,	Pittsfield.
	Joseph J. Estes, Union and Church streets,	Rockland.
	Thomas B. Nichols, 178 Essex street,	Salem.
Michigan,	Ottmar Eberbach, 12 South Main street,	Ann Arbor.
	James Vernor, 235 Woodward avenue,	Detroit.
	Jacob Jesson, Western avenue and Jefferson st.,	Muskegon.
Minnesota,	Karl Simmon, Seventh and Sibley streets,	St. Paul.
Mississippi,	Joseph W. Eckford, Commerce street,	Aberdeen.
	Matthew F. Ash, P. O. Box 129,	Jackson.
Missouri,	James M. Good, 2348 Olive street,	St. Louis.
Nevada,	William A. Perkins, 84 South C street,	Virginia City.
New Hampshire,	Francis C. Miville, 1023 Elm street,	Manchester.
	Nelson S. Whitman, 175 Main street,	Nashua.
New Jersey,	Wm. M. Oliver, 132 Broad street,	Elizabeth.
	Hermann Klussmann, Fourth st. & Lafayette ave.,	Hoboken.
	Maxwell Abernethy, 188 Newark avenue,	Jersey City.
	Charles B. Smith, 861 Broad street,	Newark.
	Howard P. Reynolds, Park and North avenues,	Plainfield.
New York,	Charles H. Gaus, 202 Washington avenue,	Albany.
	Charles O. Rano, 1872 Niagara street,	Buffalo.
	William L. Du Bois, 281 Main street,	Catskill.
	John Hepburn, 163 Main street,	Flushing.
	Harvey G. Goodale, P. O. Box 29,	Jamaica.
	James T. King, Main and South streets,	Middletown.
	John McKesson, Jr., 91 Fulton street,	New York.
	G. H. Haass, 105 East Main street,	Rochester.
	John G. Bissell, 45 Dominick street,	Rome.
	Charles F. Fish, 348 Broadway,	Saratoga.
	Charles W. Snow, 214 Warren street,	Syracuse.
	William Blaikie, 202 Genesee street,	Utica.
North Carolina,	William Simpson, 101 Fayetteville street,	Raleigh.
	John H. Hardin, 124 South Front street,	Wilmington.
Ohio,	J. U. Lloyd, Court and Plum streets,	Cincinnati.

Ohio,	George L. Hechler, 1099 Broadway,	Cleveland.
	Charles Huston, 47 South High street,	Columbus.
	Henry F. Kurfurst, 502 Xenia avenue,	Dayton.
	Thomas J. Casper, 41 East Main street,	Springfield.
	Charles Hohly, 602 S. St. Clair street,	Toledo.
Oregon,	Louis Blumauer, Fourth and Morrison streets,	Portland.
Pennsylvania,	Jacob A. Miller, Second and Chestnut streets,	Harrisburg.
	Charles A. Heinitsh, 16 East King street,	Lancaster.
	Joseph L. Lemberger, 5 North Ninth street,	Lebanon.
	Richard M. Shoemaker, Fourth and Race streets,	Philadelphia.
	George A. Kelly, 101 Wood street,	Pittsburg.
	Philip M. Ziegler, 526 Penn street,	Reading.
	John M. McNeil, Broadway,	Scottdale.
	Edward A. Cornell, Fourth and Pine streets,	Williamsport.
Rhode Island,	Wm. H. Cotton, 226 Thames street,	Newport.
	Wm. K. Reynolds, 354 Friendship street,	Providence.
South Carolina,	Edward S. Burnham, 369 King street,	Charleston.
	Oscar E. Thomas, 164 Main street,	Columbia.
Tennessee,	Jas. S. Robinson, Second and Madison streets,	Memphis.
	C. J. Gooding,	Knoxville.
	John C. Wharton, Vine and Church streets,	Nashville.
Texas,	Geo. J. F. Schmitt, 507 W. Commerce street,	San Antonio.
Utah,	Frank A. Druehl, Main and 3d South streets,	Salt Lake City.
Vermont,	Geo. A. Crossman, 2 Simonds Block,	Brandon.
Virginia,	T. Roberts Baker, 919 East Main street,	Richmond.
Washington,	Henry E. Holmes,	Seattle.
West Virginia,	Edwin L. Boggs, Kanawha Bank Building,	Charleston.
Wisconsin,	Albert H. Hollister, 3 N. Pinckney street,	Madison.
	John R. Drake, 365 East Water street,	Milwaukee.
Prov. Nova Scotia,	William A. Simson,	Halifax.
Prov. Ontario,	John Lowden, 53 Colborne street,	Toronto.
Prov. Quebec,	Henry R. Gray, 122 St. Lawrence Main street,	Montreal.

THE PERMANENT FUNDS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the San Francisco meeting in 1889, the Permanent Secretary was directed to publish annually, in the Proceedings, a brief history of the origin, money value, and use to which each Fund may be applied.

There are three permanent Funds at the present time, all of which are invested in government bonds, in the name of the Treasurer of the American Pharmaceutical Association, and kept in the custody of the Chairman of the Council.

THE LIFE MEMBERSHIP FUND.

The Constitution, as originally adopted in 1852, and up to the year 1856, contained no provision for life membership or for the creation of a permanent fund. In the year named, a revised Constitution was reported by a committee, and, after consideration, adopted (see Proceedings 1856, pp. 12, 14, 27 and 79). Article II., Section 7 (afterwards Section 8), contained the following provision:

"Members who have paid their annual contribution for ten successive years shall be considered life members, and exempt from their yearly payments, and entitled to a certificate to that effect."

Owing to increased expenditures for the publication of the Proceedings, etc., the Association found it necessary in 1867 (Proceedings. p. 75) to increase its revenue, one of the measures being the erasing of Section 8, and the total abandonment of life membership in the future.

In 1870 a revised Constitution was adopted (see Proceedings 1870, pp. 87–96), and is in force at the present time, containing the following:

"Article IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, *the annual interest of which only shall be used by the Association for its current expenses.*"

Chapter VI., Article 5, of the By-Laws adopted the same year, reads as follows:

"Any member who shall pay to the Treasurer the sum of *seventy-five dollars at a time* shall become a life member, and shall be exempt from all future annual contributions."

In the roll of members for the year 1872 (page 338) the name of the late Charles W. Badger, of Newark, N. J., appears for the first time as a life member, and the only one (until the time of his death in 1877) under this provision, which was subsequently modified (Proceedings 1879, page 799) so as to reduce the sum to be paid into the treasury by those who had been members for from five to twenty years. In the same year the published roll contained the names of two new life members. The article on life membership was further modified in 1888 (Proceedings, page 52) so as to apply also to those who have been members for over twenty years (see Chapter VIII., Article 4 of By-Laws). Under this clause the life membership (new style) of the present roll is thirty-nine, as published in the Proceedings.

The Treasurer's report for 1880 (page 524) states the life membership fund to be $75, for 1881 (p. 513) $613, for 1882 (p. 608) $685, for 1883 (p. 436) $904.38, and for 1884

(p. 524) $944.14. At the Milwaukee meeting, held in the same year, the Association directed (Proceedings, p. 525) that $316, which amount had been in past years donated to the funds of the Association by various members, be withdrawn from the general fund and be added to the Life Membership Fund. At the Providence meeting in 1886 (Proceedings, p. 147), it was recommended by the Finance Committee, and approved by the Council and by the Association, that the sum of $3,000 be transferred from the general fund to the Life Membership Fund. At the Cincinnati meeting in 1887 (Proceedings, p. 471), the Association ordered again a transfer to the same fund of $4,000.

Since 1887 the annual reports of the Chairman of the Council give the number of each bond of the Government securities in which the Life Membership Fund is invested. The report published on page 17 of the present volume shows that on July 1st, 1895, the value of the Life Membership Fund was $10,933.27, of which sum *the annual interest only shall be used by the Association for its current expenses.*

THE EBERT FUND.

At the Richmond meeting in 1873 (Proceedings, p. 58), Mr. Albert E. Ebert presented to the Association the sum of five hundred dollars, to be used in the following manner:

"The money to be properly invested by order of the Executive Committee, and the annual interest derived therefrom to be appropriated *for conferring a suitable prize* for the best essay or written contribution containing AN ORIGINAL INVESTIGATION OF A MEDICINAL SUBSTANCE, determining new properties, or containing other meritorious contributions to knowledge; or for IMPROVED METHODS of determined merit, for the preparation of chemical or pharmacal products: the prize to be awarded by a suitable committee within six months after the annual meeting at which the essays are presented for competition; *provided*, that in case not one of the essays offered is of sufficient merit to justify the award, in the judgment of the Committee on Prize Essays, all may be rejected, and the sum added to that of the Fund."

The offer was accepted by the Association, and by a special vote (*Ibid.*, page 70) the fund was ordered to be called the *Ebert Fund*, and the prize awarded from the proceeds to be known as the *Ebert Prize.*

The Ebert Prize was awarded for the year 1874 to Chas. L. Mitchell; for 1877, to Fred. B. Power; for 1882, to John U. Lloyd; for 1886, to Emlen Painter; for 1887, to Edward Kremers; for 1888, to Jos. F. Geisler; for 1890, to Wm. T. Wenzell; and for 1891, to John U. Lloyd.

The Ebert Fund amounted in 1883 (Proceedings, p. 436) to $683.43. Since 1887 the reports of the Chairman of the Council specify the securities in which this fund is invested. On July 1st, 1895 (Proceedings, p. 17), its reported value was $777.47. The *annual interest must be applied to a prize for an original investigation* meeting the requirements stated above.

THE CENTENNIAL FUND.

After the meeting held in Philadelphia in 1876, the local committees, on settling all accounts for the entertainment of the Association, had an unexpended balance left, which by subsequent collections made in Philadelphia was increased to $525. At the Toronto meeting in 1877 (Proceedings, p. 481), Dr. A. W. Miller, local secretary for 1876, presented this sum in the name of the local committees, to the Association, with this condition, "that a like amount be subscribed by the members within one year," with a view of establishing a fund *to aid in the prosecution of original investigations*, the interest accruing from the investment of the fund to be devoted to the defraying of expenses actually incurred by members in conducting investigations in some branch of science

connected with pharmacy. The Association accepted the conditions (*Ibid.*, pp. 526, 528), and adopted the name *Centennial Fund.*

The collection of a like amount by the Association was completed at the Saratoga meeting (Proceedings 1880, p. 553), when $582.81 had thus been received. In the following year a committee of the Centennial Fund was provided for in the By-Laws of the Council, Chapter VII. (Proceedings 1881, pp. 190, 549). Members have not availed themselves of this Fund to the extent contemplated at its foundation; for the amounts paid out have been only $7.50 to Rob. B. Warder for material used for investigations reported in 1885; $96.80 used by the Committee on National Formulary during the years 1886 and 1887 (Proceedings 1889, page 16); and $32 to Edward Kremers for material necessary for the prosecution of scientific research on the menthol group, reported in the Proceedings for 1892, $50 to the same investigator in 1893, and $50 again to the same investigator, as shown in the present volume.

The original sum of $1117.81 ($525 + 582.81) had increased in 1883 to $1232.76. Since 1887 the securities in which the Fund is invested are specified in the reports of the Chairman of the Council; the reported value was $1449.42 on July 1, 1895 (see Proceedings, p. 17). *The interest accruing from this Fund is to be used for defraying the expenses incurred in conducting original investigations in pharmacy or an allied science.*

THE GENERAL FUND.

In October, 1891 (see Proceedings 1892, page 13), the Council instructed the Treasurer to draw from the cash on deposit a sufficient sum and purchase therewith three bonds, one thousand dollars each, the same to be such bonds as shall be approved by the Finance Committee, said bonds to be registered in the name of the Treasurer of the American Pharmaceutical Association, and placed in the custody of the Chairman of the Council.

The investment was made in bonds of the American Security and Trust Company at Washington, D. C., for the sum of $3021.62 (see Proceedings 1892, pages 27 and 28).

PRIZES.

The following resolutions were adopted August 15, 1893 (see page 56, Proc. 1893):

Resolved, That if worthy papers be presented, the Association award annually three prizes for the three most valuable papers, aggregating the sum of $150.00, and apportioned as follows: $75.00 for the first, $50.00 for the second, and $25.00 for the third prize.

Resolved, That a Committee of three be annually appointed by the President of the Association, their duty to be, first, to decide if one or more of the papers presented are worthy of a prize, and second, to decide upon the relative merits of such papers as are deemed worthy.

Resolved, That nothing in these resolutions shall be so construed at any time as to prevent the writer of the Ebert Prize paper from also receiving one of the Association Prizes for said paper.

For names of members of this committee see page v.

The old resolution on Prizes which the above replaces will be found on page 506 of the Proceedings for 1887.

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PREFATORY NOTICE.

At the forty-second annual meeting of the Association held at Asheville, N. C., the Council determined that the distribution of the printed Minutes, together with the papers read at the meeting, in advance of the bound volume of the Proceedings, which plan had been in operation since 1891, should be discontinued. This action of Council was approved by the Association at large at its final General Session on September 8, 1894.

With the view of securing for the Proceedings as wide a distribution as possible, and to enable members to complete their sets at very low figures, the Council, at the forty-third annual meeting held at Denver, Colo., decided that the price of the Proceedings for 1890 and all previous years be reduced to one-half of that heretofore published. The Association at its last General Session held on August 20, 1895, approved the action of Council, and the Committee on Publication offer the different issues at the following rates:

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1856 is out of print; none published in 1861.

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1859	8	1 85	1 48	1873	21	10 35	6 21	1886	34	31 35	12 54
1860	9	2 35	1 65	1874	22	11 85	7 11	1887	35	33 35	13 34
1862	10	2 85	2 00	1875	23	13 35	6 68	1888	36	36 10	14 44
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1864	12	3 85	2 70	1877	25	16 35	8 18	1890	38	41 60	16 64
1865	13	4 35	3 05	1878	26	17 85	8 93	1891	39	47 10	18 84
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1867	15	5 85	4 10	1880	28	20 85	10 43	1893	41	58 10	23 24
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Orders for Proceedings should be sent to the Permanent Secretary, 109 Aisquith street, Baltimore, Md.

The gold badge of the Association may be procured from the Permanent Secretary on receipt of $2.

Blank forms of applications and recommendations for membership may be obtained from the Permanent Secretary or from the Committee on Membership; when properly filled up they should be sent to the Secretary of the Committee on Membership, Geo. W. Kennedy, Pottsville, Pa., at least one week before the meeting; if sent later, they should be addressed to him in the care of the Local Secretary, Joseph E. Morrison, 33 Church St., Montreal, Can.

The forty-fourth annual meeting of the Association will convene in Montreal, Canada, on the second Wednesday (12th day) of August, 1896, at 3 o'clock p. m.

PROPOSED AMENDMENTS TO THE CONSTITUTION.

TO BE ACTED ON AT THE FORTY-FOURTH ANNUAL MEETING, DUE NOTICE HAVING BEEN GIVEN AT THE DENVER MEETING.

Amend paragraph 2 of Article I. as follows: Add the word "such" after "encourage;" substitute the word "among" for "between," and the words "as may" for "which shall."

Amend Article III. as follows: Substitute the word "General" for "Permanent" in the second line, and take out the words, "with the exception of the Permanent Secretary," in the third line. Put a period after the word "Council" in the fourth line, and substitute the word "They" for "and" in the same line.

Amend Article III. by adding the following sentence at the end of the Article: "No member shall be eligible to any of these offices until after he shall have been an active member for at least five years."

MINUTES

OF THE

FORTY-THIRD ANNUAL MEETING.

FIRST SESSION, WEDNESDAY AFTERNOON, AUGUST 14, 1895.

THE forty-third annual convention of the American Pharmaceutical Association was called to order at 3:30 p. m., August 14, 1895, in the Brown Palace Hotel at Denver, Colorado, by First Vice President, Charles M. Ford, in the following words:

Ladies and Gentlemen: We have to open this session with an apology for having delayed you in the commencement of these exercises, and that apology involves also an apology for having the largest attendance I have ever seen in a convention of the American Pharmaceutical Association. I shall not attempt to explain in detail why so many are attracted to Denver. It is evident that the famous attractions of Denver are the causes which bring you here.

It becomes my pleasure and duty, ladies and gentlemen, to introduce to you the chief Executive of the State of Colorado, Governor McIntyre.

The Hon. A. W. McIntyre, Governor, was received by the convention with applause and made the following address of welcome:

Mr. President and Ladies and Gentlemen of the American Pharmaceutical Association: It is my pleasant duty to extend to you on behalf of the State a welcome, not only to those who are citizens of the United States but to those of you who are residents and subjects across the border, as well.

This morning when I got up and looked out of the window I noticed that the weather was very forbidding. As last night promised a pleasant day, I could not account for it until upon picking up the paper I found that there was to be a convention here which had some Bostonians in it (laughter). For a long time our climate here has been very pleasing to us and those who have visited us, and we have never had occasion to find fault with it except when a Raymond excursion comes out from Boston. Raymond excursions always come from Boston and by their presence, or in some other way, disturb the atmosphere. I don't know whether it is because particles from the "Hub" have so much greater weight when they get to the rim or not.

I am pleased to see before me representatives of that great body of men who by their accuracy and knowledge prevent the physicians from laying us all away in the grave (laughter). Of course, before our time. Every one has known many cases in which the pharmacist's accuracy has saved the life of a patient. I hope there are no doctors

here (laughter) because I prefer to have in mind the qualities of the particular body that is before me.

But I will not detain you by talking. You are here for a better purpose. I believe that you will find your stay here profitable and I hope you will find it pleasant. I hope, too, that you will find time and inclination to go about through the State. We have a State we are very proud of—a State, the great resources of which we ourselves are scarcely sufficiently acquainted with to appreciate. We feel that we can show to you in your going about the State, if you will do us that honor, that we really have a State greater than the representations that have been made to you. I hope too, as I said before, that you will find your meeting here and your deliberations both profitable and pleasant. I again welcome you to our State. (Applause.)

MR. FORD: We have also with us the Chief Magistrate of Colorado's principal city, the Hon. T. S. McMurray, who will have a few words to say to you. (Applause.)

MR. MCMURRAY: Mr. President, Ladies and Gentlemen: I hardly know that I can add anything to the words of welcome that his Excellency the Governor has extended to you, but I wish, on behalf of the city of Denver, to say to you that I cordially endorse all that he has said on behalf of the State. I trust as you come among us that you will find your trip here pleasant and profitable. I trust as you go away from us when you have finished your sojourn, that you will go with pleasant recollections of the time that you have spent in the State of Colorado, and especially in its capital city. I hardly know what I could say particularly appropriate to your Society. You are our friends in trouble. It is to you we go when we are in trouble, and perhaps on no other occasion, unless it is in the hot weather when we want to patronize your soda fountain and other et ceteras that you have. Whatever may be the cause, as the Governor has said, you are our friends when we need you, and upon the accuracy with which you put up the prescription that the physician may give you, oftentimes depend—and there is more truth than poetry in the statement—the lives of those whom you are treating. As you are from time to time considering the subject as to how you can best advance your particular line of business, we all feel that you are not doing it simply for the profit to yourselves, but for the good of all mankind. (Applause.) And so we all ought to look beyond the selfish idea that all these different societies and lines of business are simply working for themselves. I do not believe that that is the case. I believe that these conventions which meet here from time to time—and we are always glad to welcome you all—I believe that you come in order to consider the particular lines of business with which you are connected, and to so consider them that you may not only make it more profitable to yourselves, but especially more beneficial to the rest of mankind with whom you may come in contact. Of course, the recreation and pleasure which you have is no small item in your annual conventions. Now, I trust you may have a full share of that pleasure and recreation as you come among us, but as you go through our State, as you enjoy the beautiful weather that we think we have in the State of Colorado above other places, you may perhaps be disappointed that your business is apt to be disturbed. But let us tell you that we have the facilities that will help you out on the other side. Although you may not have the full extent of patronage on account of the extreme good health we always enjoy, we still manage to take care of you in your line of business, because we always have a constant influx of sick people from the East who are always ready patrons of the Colorado druggist. (Applause).

Let me, on behalf of the city of Denver, whose chief executive I have the honor to be, say that while you are among us we hope you will feel that the city is yours, that you are here to enjoy yourselves, outside of the line of your deliberations. I trust that when you go away from here you will have such pleasant recollections of your stay in Denver and Colorado that before very long you will be glad to come back and visit us again. (Applause.)

THE PRESIDENT: Ladies and Gentlemen, I now have the pleasure of introducing to you our second Vice-President, Mr. John N. Hurty, who will respond to the addresses of welcome which have been delivered.

MR. HURTY: Mr. Governor, Mr. Mayor, and Citizens of Denver: I take it as a distinction that I have been called upon to respond to these hearty welcomes, and on behalf of the pharmacists I extend to you a thousand thanks for your great kindness. Many of us, Sir, perhaps most of us, are from those states east of the Mississippi. There are those here I know whose homes are in Canada, the great Empire State of New York is represented here, and Massachusetts, and New Jersey, Pennsylvania, North Carolina and Alabama, Ohio too, and the bloody ground of Kentucky is also represented here, and also Iowa, Illinois, and other states; and last but not least, my own beloved state of Indiana, the home of James Whitcomb Riley, and Benjamin Harrison. (Applause.)

We all know that in those great commonwealths we have grand mountains, noble forests, beautiful streams and lakes, vast areas of arable land with its nodding grain, but nowhere upon the earth, I think, will you find more grandly grand mountains than in Colorado. These mountains that we see on every hand with hearts of gold and silver, they are certaintly beautiful to look upon, and inspiring to us in every way. Believe it, Sir, there are some of us so ignorant—and I am one of them—who thought that Colorado was exclusively a rocky state. We knew you had the grand mountains, and we thought we would find nothing but rocks and stone, and that in our whole course we would probably not find enough grass to feed a tarantula nor enough water to stick a postage stamp. But we know better now. We have come through fertile valleys, so far as the eye could reach, valleys of grass and grain, feeding herds and beautiful ranches, and I have been surprised at every turn and I have delighted in it.

We have known, I say, every one of us, hospitality, but I will venture to say that none of us has ever met with a more generous hospitality, with a kinder, sweeter hospitality than we have met with here. (Applause). We will return to our homes with sweet memories of this place. We will regard the great mountains that we have seen as types in their ruggedness and grandeur of the people who live here. We know that to be true. I would be pleased to stand here and utter further sentiments and thoughts and feelings that I have had, but lest I should prove a spendthrift with my tongue, I will do what the great Cæsar did when he came to the Rubicon, and that is—pause. (Applause.)

President Simpson here called Vice-President Hurty to the chair, and proceeded to read his annual address as follows:

Fellow Members of the American Pharmaceutical Association: The meeting of the Association which took place last September at Asheville, North Carolina, important as it was, both in its aims and its results, will be remembered chiefly, I think, for the interest attaching to the place in which it was held. Those who were present will not easily forget the beauty and grandeur of the mountain region of North Carolina; but I may mention the fact that our place of meeting last year was within sight of the highest mountain summits east of the Mississippi, and now again we "meet upon the high places of the earth," amid aspects of nature grander and more impressive still. Here we are almost upon the very roof of the continent, that great "divide" that sends its streams on the one hand to the Pacific Ocean, and on the other to the Gulf of Mexico, and so to the Atlantic.

From such a height as this it is easy to take broad views of our country as a whole; and with the "mind's eye" to include in one vast survey Canada in the north—for Canada is really a part of this country; there the Atlantic and Gulf States of the Union; here the great basin of the Mississippi; next this magnificent system of mountains and

plateaus, and beyond this still, the States of the Pacific Slope. It is easy from such a height to perceive that throughout this endless variety of surface, soil and climate, there runs a grand simplicity and unity of plan—easy, too, to believe that this unity is typical of a yet grander unity which is to make of our present diversity of tongues and temperaments, of customs and convictions, one truly great and matchless American people, able and worthy to lead the world.

It has been said that most great men are born within sight either of the mountains or of the sea. If this be true, what may we not expect of a people reared amid influences like these? Where, if not here, shall we seek for men of energy and enterprise, of lofty purpose, of breadth of view and of steadfast devotion to principle?

But we are not here to wonder or to speculate, but to do the work that lies before us with the earnestness to which the importance of that work may well incite us. Allow me to add, not as a matter of speculation, but as a matter of assured knowledge, that to whatever influence it may be attributable, we can safely count with absolute certainty on large-hearted Western hospitality, and we all know upon what a scale Denver bids welcome to her guests.

In the regular course of official duty, I have appointed the usual committees, and in addition to these a Committee called for by a resolution passed at our last meeting, with reference to the status of pharmacists in the Army and Navy, with a view to securing for them, by Congressional action, the rank and pay of Assistant Surgeon. I have, in accordance therewith, appointed a Committee consisting of one member for each State and Territory, whose names will be found on page 6, Vol. 42 of the Proceedings.

And now, before proceeding further, I must make one complaint against my distinguished predecessor. In looking over the subjects which come within the province of this Association, and upon which I, as your presiding officer, might naturally be expected to comment, I find that he has left nothing unconsidered except the one who might succeed him in this Chair, and that one he has left with very little indeed to say. Still there is one subject which even he could not exhaust, a subject of such vital concern both to the pharmacist and the public at large, as to be always full of interest, and, indeed to command your most earnest attention. I mean, of course, the subject of education; and while what has just been said applies to the subject as a whole, I would recommend that the attention of this meeting be given first and chiefly to that aspect of it, which relates to the qualifications of druggists. The great importance of the matter will, I trust, warrant my treating it at some length.

Judging from our choice of meeting places lately—in the White Mountains of New Hampshire, the Alleghanies of North Carolina, and now in the Rocky Mountains—the motto of the Association would seem to be "Excelsior," and it is to be hoped that a corresponding onward and upward tendency may continue to be characteristic of our work. But let us not forget another characteristic of mountains, without which their elevation would be impossible; I mean their stability, their sure foundation; and let us put into our work this quality also of the "everlasting hills." Let us seek to establish our profession on the broad foundation of living, active intelligence, and then we may hope by conscientious endeavor to build it up to any desired eminence of usefulness and honor.

We have now among us, it is true, experts and specialists of whose attainments any profession might well be proud. The work and the influence of such men is, I know, of incalculable value. Still all this is not enough. We need greater intelligence, a quickened intellectual life, among the rank and file of the profession.

The Schools of Pharmacy throughout the county are doing excellent work. They have no serious difficulty, I believe, in maintaining a satisfactory standard of requirements for admission to their classes. As yet, however, the number of their graduates is comparatively small, and their influence for good, though certainly great, is still inadequate to our need. Our ranks are recruited mainly from among drug-store apprentiees, the majority

of whom are poorly equipped educationally for the work they have undertaken to do. Just here lies our trouble. This is the weak point in the structure we are seeking to erect, and I beg you to notice that this weakness is in the foundation.

The State Boards are doing what they can to insure a fair amount of technical knowledge in those whom they license to practice pharmacy; but they can never correct the evil of which we complain, so long as their powers are restricted to testing the merely technical knowledge of candidates.

But I need not argue this point further. All present are agreed, no doubt, that our weakness, nay our danger, lies in this lack of intelligence, this inadequate intellectual discipline and attainment on the part of those now crowding into the profession. The difficulty of the situation, as I understand it, is to agree upon the right application of the only possible remedy, namely, improved general education as a prerequisite to apprenticeship.

Two years ago, at the meeting of the International Pharmaceutical Congress, held in Chicago, resolutions were adopted declaring what should be the educational qualifications of apprentices seeking to enter the drug business, and the time that they should be required to serve. At the Asheville meeting last year I had the honor to introduce a similar set of resolutions, which were adopted by this Association. See page 353 of Vol. 42 of the Proceedings.

It has been thought by some that these requirements are perhaps a little too far in advance of the present status of pharmacy to receive the support that they merit. Recognizing this fact, and at the same time feeling the great importance of the subject to the future welfare of our profession, and recognizing also the fact that it is desirable to make an early beginning, no matter how modest or unpretentious that beginning may be, I therefore recommend that resolutions embodying the following features be passed by this body. In the opinion of the American Pharmaceutical Association, the best interests of Pharmaey as a profession demand that a definite minimum standard of preliminary general education of all persons entering drug-stores to learn the art of Pharmacy ought to be enforced by the Boards or Commissioners of Pharmacy of the respective States, and that the preliminary education possessed by all such persons ought to be at least equivalent to that required for admission to the public high schools; that all persons applying for registration as pharmacists or assistant pharmacists should be required to give satisfactory evidence of sufficient general education, by examination or otherwise, and should not be registered or licensed as pharmacists or assistant pharmacists if deficient in that respect; and that a copy of this resolution be transmitted by the Permanent Secretary of this Association to each Pharmaceutical examining board or commission or Board of Pharmacy in the United States.

It may have occurred to some present that the end we have in view might be secured by simply requiring applicants for license to pass an examination in some prescribed course of general study in addition to that of Pharmacy. A little reflection, however, would show that such a plan would be impracticable. For an ordinary apprentice to pursue a course of study in addition to what is already required of him is out of the question. He has neither time, strength nor inclination for it, to say nothing of the lack of a teacher. If a boy has already completed the required course before beginning his apprenticeship, it would be unreasonable to expect him to stand a satisfactory examination in it after four years of enforced neglect. Besides all this, we are not concerned to know how many facts of history or rules of grammar the candidate may happen to remember. The important thing is that, before undertaking the study of Pharmacy, he shall have acquired a good degree of intellectual strength and training, the habit of systematic application, some knowledge of himself and the world about him, and above all, that he shall have acquired such appetite for knowledge that, in his own chosen branch at least, he may be trusted to do thorough work.

The value of a good general education in its bearing upon the particular pursuit in which one may be engaged, is not commonly well understood. Some good people look upon a College education as a key to all prosperity, a sort of "open sesame" to fortune's treasure house; while, on the other hand, many, who are nothing if not practical, hold that the earlier a young man devotes himself exclusively to his chosen pursuit, the better his chance of success. I need hardly say to a body like this that neither of these views contains the whole truth. It is possible, of course, to spend too much time in aimless study, and we may even acquire at College the indolent habits of the bookworm. But these are by no means the necessary results of education properly so called. They are rather the results of faulty method and ideals, which are now happily giving way to something better.

A young man may be said to be well educated, I think, when, having first been trained to the right use of his senses, he has further learned to digest and assimilate what he reads. The maxim "through hand and eye to the brain," points us no doubt to Nature's way—the wisest and best way—of training the young; but education ought not to stop here. The mind, also, needs to be developed and trained till it is able, not only to interpret rightly what the senses report, but to deal intelligently with words and ideas—to seize their meaning with as firm a grasp and as clear an insight as belong to hand and eye in the world of matter and motion. Indeed, I am not sure that the ability to read intelligently (by which I mean the power not only to get from the printed page all that the writer intended to convey, but to compare the matter thus acquired with similar matter already known, and to estimate it at its true value)—I am not sure, I say, that the ability to read in this way ought not to be ranked even higher than the ability to observe for one's self, however keenly, the objects and phenomena of the material world. There is no need, however, to measure these powers one against the other. There is no necessary antagonism between the two. On the contrary, they go hand-in-hand, each aiding the other and doubling its efficiency.

Nothing is understood that stands alone. To understand a thing, is to place it in its right relation to surrounding objects, and the more numerous the points of contact the more complete the understanding. To be able to give from memory the name of an object and one or two of its properties, is hardly to know it at all; but, in a profession like ours, certainly "a little learning is a dangerous thing." It is with a view to saving our apprentices from mistakes on this point that we would insist upon their postponing the study of pharmacy till the mind has been so far developed by previous study as to have a wholesome appetite for genuine knowledge, and has been so far trained as to be able to acquire it.

If such a requirement should have the effect of excluding the incompetent and the indifferent, so much the better for them, for us, and for the public; for to repeat what has been expressed above, in a profession like ours, with its great responsibilities, incompetence is sin.

The advice, "know something of everything, and everything of something," seems especially appropriate to druggists. Some knowledge of Latin, as we are all aware, is of direct use to the apprentice in throwing light upon the nomenclature of the business; but its chief value lies in its power to illumine the mind itself—to light up the whole intelligence by cultivating a sense of the right use of words, the real nature of language. Substantially the same may be said of mathematics, science, history, in fact any study that teaches one to consider the meaning of words, to compare, to discriminate, to classify, to reason—in a word, to think for one's self.

Consider for a moment the difficulties in the way of an apprentice without such mental discipline. He must commit to memory an endless succession of disconnected facts, which he, through ignorance of general principles, has no power to arrange and classify. These facts are conveyed in language that to him is virtually an unknown tongue; and

all these difficulties he must encounter with a mind untrained to habits of systematic application.

But I need not dwell longer upon this subject. There can hardly be two opinions as to the desirability of the end we have in view. Just how that end is to be secured is for you to determine. The obstacles in the way are serious enough, but are not, I trust, insurmountable.

Upon motion of Mr. Gordon the annual address of the President was referred to a committee of three to be appointed by the presiding officer. The following members were appointed as such committee: Messrs. M. W. Alexander of Missouri; J. P. Remington of Pennsylvania, and W. C. Alpers of New Jersey.

President Simpson here resumed the chair and called for the reading of the minutes of the Council. Mr. Kennedy, Secretary of the Council, then read the minutes of the sixth session of the Council, stating that as this session had been held since the last meeting of the Association, the minutes should be acted upon at this time.

The following business was reported as having been disposed of by correspondence:

POTTSVILLE, PA., *October* 2, 1894.

Dear Sir: It is moved by Charles Caspari, Jr., and seconded by Charles E. Dohme that the Association adopt the accompanying design and inscription as its official seal.

Please send your vote to the undersigned.

Yours, &c., GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Alpers, Caspari, Diehl, Dohme, Ford, Hurty, Kraemer, Ramsperger, Scholtz, Sheppard, Simpson, Thompson, Voss, Watson, Whelpley.

Nay—Morrison.

POTTSVILLE, PA., *October* 2, 1894.

Dear Sir: It is moved by S. A. D. Sheppard and seconded by Charles E. Dohme that the Permanent Secretary be authorized to have two seals made, one for his own use and one for the use of the Treasurer.

Please send your vote to the undersigned.

Yours, &c., GEO. W. KENNEDY, *Secretary of Council.*

Carried unanimously.

POTTSVILLE, PA., *October* 2, 1894.

Dear Sir: It is moved by W. S. Thompson and seconded by S, A. D. Sheppard that the Permanent Secretary, Treasurer and Charles E. Dohme be made a committee to revise the list of names to which complimentary copies of the annual reports of the Association are sent.

Please send your vote to the undersigned.

Yours, &c., GEO. W. KENNEDY, *Secretary of Council.*

Carried unanimously.

POTTSVILLE, PA., *October* 19, 1894.

Dear Sir: It is moved by S. A. D. Sheppard and seconded by Charles E. Dohme that the Chairman of the Council be authorized to rent a box from The American Security &

Trust Company of Washington, D. C. at an annual rental of five dollars, the securities belonging to the several Funds to be kept in said box.

Please send your vote to the undersigned.

Yours, &c., GEO. W. KENNEDY, *Secretary of Council.*

Carried unanimously.

POTTSVILLE, PA., *October* 25, 1894.

Dear Sir: The undersigned moves that the Council direct the Publication Committee to have an impress of the seal recently adopted, placed upon the title page of the Proceedings, and that the Permanent Secretary be authorized to have a suitable electrotype of said seal made for the purpose, the cost of which has been ascertained to be about six dollars, of which five dollars or $5.50 will be for the necessary wood-cut.

(Signed) CHARLES CASPARI, JR.

Seconded by S. A. D. Sheppard.

Please send your vote to the undersigned.

GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Alpers, Caspari, Diehl, Dohme, Hurty, Kraemer, Ramsperger, Sheppard, Simpson, Thompson, Voss, Watson, Whelpley, Whitney—14.

Not voting—Ford, Morrison and Scholtz.

POTTSVILLE, PA., *November* 26, 1894.

Dear Sir: It is moved by Charles Caspari, Jr., and seconded by Charles E. Dohme, that a copy of the Proceedings for 1893 be sent to Messrs. Martindale of England, Nyegaard of Norway and Ramlot of Brussels, who as delegates to the Seventh International Pharmaceutical Congress were in Chicago last year and attended all the meetings of the American Pharmaceutical Association.

It is also moved and seconded by the same gentlemen that a copy of the 1893 Proceedings be sent to Mrs. and Miss Maisch, widow and daughter of our late Permanent Secretary.

Yours, &c., GEO. W. KENNEDY, *Secretary of Council.*

Carried unanimously.

DENVER, COL., *December* 6, 1894.

MR. GEO. W. KENNEDY, *Secretary of Council American Pharmaceutical Association: Dear Sir:* Mr. Ford and myself have canvassed the question of time for holding the next annual meeting of the American Pharmaceutical Association in Denver, and we beg leave to present the following reasons for as early a date as June 19th.

First. It is a pleasant time of the year for traveling long distances, as many would be obliged to do, and also a very pleasant time of the year to visit Colorado. It will permit those who attend to get back home by July 4th, and likewise enable those who desire to do so to accompany their families to the seashore by July 1st.

Second. The Knight Templars' Conclave occurs on August 27th, in Boston. Those who desire to be at this meeting will have rested from their journey to the far West.

Third. The National Wholesale Druggists' Association meets here September 3d, and it was hoped that the American Pharmaceutical Association and the former would hold their meeting at about the same time; but the local representatives of the National Wholesale Druggists' Association do not consent to such an arrangement, and ask us to meet after them. We do not think this as desirable a time of the year to visit Colorado, as the date we have selected, and we therefore suggest on this account that our meeting be held sufficiently in advance to enable any of our members to attend the Conclave or the National Wholesale Druggists' Association meeting if they desire to do so.

I therefore move that the date of the next annual meeting of the American Pharma-

ceutical Association, to be held in the city of Denver, commence on Wednesday, June 19, 1895.

(Signed) E. L. SCHOLTZ.

Seconded by Charles M. Ford.

Please send your vote on the above at once.

Yours, etc., GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Caspari, Diehl, Dohme, Hurty, Kraemer, Morrison, Ramsperger, Sheppard, Simpson, Voss, Watson, Whitney—12.

Nays—Alpers, Thompson.

Not voting—Ford, Scholtz.

PROPOSED PROGRAMME FOR THE NEXT ANNUAL MEETING AT DENVER, COL.

Wednesday, June 19.	9:30 a. m.	Council Meeting.
	3:00 p. m.	First General Session.
	9:00 p. m.	Reception.
Thursday, June 20.	9:30 a. m.	Second General Session.
	3:00 p. m.	Section on Commercial Interests.
Friday, June 21.	9:30 a. m.	Section on Scientific Papers.
	3:00 p. m.	Section on Scientific Papers.
Saturday, June 22.	9:30 a. m.	Section on Scientific Papers.
	3:00 p. m.	Section on Scientific Papers.
Sunday, June 23.	Rest.	
Monday, June 24.	9:30 a. m.	Section on Pharmaceutical Education and Legislation.
	3:00 p. m.	Section on Pharmaceutical Education and Legislation.
Tuesday, June 25.	9:30 a. m.	Section on Pharmaceutical Education and Legislation.
Wednesday, June 26.	9:30 a. m.	Final Session of the Association.

A few slight changes may become necessary to meet the wishes of the Committee on Arrangements.

I move the adoption of the above programme, and its publication in the Proceedings for 1894. (Signed) CHARLES CASPARI, JR.

Seconded by Charles E. Dohme.

Result of vote. Yeas—Alpers, Caspari, Diehl, Dohme, Ford, Hurty, Kraemer, Morrison, Ramsperger, Sheppard, Simpson, Thompson, Voss, Watson, Whelpley, Whitney.

Not voting—Scholtz.

DENVER, COL., *January* 25, 1895.

GEO. W. KENNEDY, ESQ., *Secretary of Council American Pharmaceutical Association.*

Dear Sir: Whereas, the date June 19th recommended by us and adopted by Council as the time for holding the Forty-third Annual Meeting appears to be unsatisfactory to a considerable portion of the membership of the Association, and whereas the Denver druggists have no choice in the matter other than that which shall serve the best interests of our Association, therefore in deference to the expressed wish of many of our oldest and most active members, and in the hope that a date may be named which shall be acceptable to all, I move that the action of Council fixing the above date be reconsidered.

(Signed) CHARLES M. FORD.

Seconded by E. M. Scholtz.

Please send your vote to the undersigned on the above motion.

Yours, &c., GEO. W. KENNEDY, *Secretary of Council.*

Pottsville, Pa., January 29, 1895.

Yeas—Alpers, Caspari, Diehl, Dohme, Ford, Hurty, Kraemer, Scholtz, Simpson, Thompson, Voss, Whelpley and Whitney.

Nays—Ramsperger, Sheppard.

Not voting—Watson and Morrison.

POTTSVILLE, PA., *February* 5, 1895.

Dear Sir: It has been moved by Charles E. Dohme, and seconded by Charles Caspari, Jr., that the date for the beginning of the next annual meeting be fixed for Wednesday, August 14, 1895.

Please send your vote to the undersigned.

Yours, &c., GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Alpers, Caspari, Diehl, Dohme, Ford, Hurty, Morrison, Ramsperger, Sheppard, Simpson, Thompson, Voss, Watson, Whelpley and Whitney.

Not voting—Kraemer and Scholtz.

POTTSVILLE, PA., *February* 7, 1895.

Dear Sir: In view of the change of date for holding the next annual meeting, the undersigned moves that the Council approve the following programme and that the same be published in the Proceedings for 1894:

PROPOSED PROGRAMME FOR THE NEXT ANNUAL MEETING AT DENVER, COL.

Wednesday, August 14,	9:30 a. m.	Council Meeting.
	3:30 p. m.	First General Session.
	9:00 p. m.	Reception.
Thursday, August 15,	10:00 a. m.	Second General Session.
	3:30 p. m.	Section on Commercial Interests.
Friday, August 16,	10:00 a. m.	Section on Scientific Papers.
	3:30 p. m.	Section on Scientific Papers.
Saturday, August 17,	10:00 a. m.	Section on Scientific Papers.
	3:30 p. m.	Section on Scientific Papers.
Sunday, August 18,		Rest.
Monday, August 19,	10:00 a. m.	Section on Pharmaceutical Education and Legislation.
	3:30 p. m.	Section on Pharmaceutical Education and Legislation.
Tuesday, August 20,	10:00 a. m.	Section on Pharmaceutical Education and Legislation.
Wednesday, August 21,	10:00 a. m.	Final General Session.

A few slight changes may become necessary to meet the wishes of the Committee on Arrangements. (Signed) CHARLES CASPARI, JR.

Seconded by Charles E. Dohme.

Please send your vote to the undersigned.

Yours, &c., GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Alpers, Caspari, Diehl, Dohme, Ford, Hurty, Morrison, Ramsperger, Sheppard, Simpson, Thompson, Voss, Watson, Whelpley and Whitney.

Not voting—Kraemer and Scholtz.

POTTSVILLE, PA., *March* 14, 1895.

Dear Sir: It is moved by S. A. D. Sheppard and seconded by Charles Caspari, Jr.

Whereas the Pharmaceutical Era has requested the temporary loan of certain photographs of past officers of the Association now in the possession of the Permanent Secre-

tary, said photographs to be used in preparing a group portrait of past and present officers of the Association, therefore resolved that the Permanent Secretary be and is hereby authorized to loan the same to the Pharmaceutical Era, they to be placed in the personal care of Mr. David O. Haynes, one of the members, he becoming personally responsible to the Secretary for their safe keeping and prompt return.

Please send your vote to the undersigned.

Yours, &c., GEO. W. KENNEDY, *Secretary of Council.*

Carried unanimously.

POTTSVILLE, PA., *March* 18, 1895.

Dear Sir: The Chairman of the Special Committee on the Status of Pharmacists in the Army and Navy of the United States, having applied to the Council for an appropriation to cover expenses incurred in furtherance of the work of said Committee, it is moved by Charles Caspari, Jr., and seconded by S. A. D. Sheppard, that the sum of twenty dollars be appropriated from the treasury and placed at the disposal of the Committee.

Please send your vote to the undersigned.

Yours, etc., GEO. W. KENNEDY, *Secretary of Council.*

Carried unanimously.

POTTSVILLE, PA., *July* 2, 1895.

Dear Sir: It is moved by S. A. D. Sheppard and seconded by Charles Caspari, Jr., that Dr. H. M. Whelpley, of St. Louis, be requested to have fifty gold bars made for the Denver meeting to be attached to the Association badge.

Please send your vote to the undersigned.

Yours etc., GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Alpers, Caspari, Diehl, Dohme, Hurty, Kraemer, Morrison, Ramsperger, Sheppard, Simpson, Thompson, Voss, Watson, Whelpley.

Not Voting—Ford, Scholtz. Whitney.

The Secretary of the Committee on Membership presented a list of names of 216 applicants.

On motion, it was directed to take the usual course.

The Committee appointed to make an inventory of the property of the Association, presented through Charles Caspari, Jr., a list of the books transferred to the office of the new Secretary.

H. M. Whelpley, the Committee of One who was authorized to purchase fifty gold bars for use at the Denver meeting, reported having attended to the same, and that the bars were now in the possession of the Permanent Secretary.

The Secretary of the Committee on Membership, G. W. Kennedy, presented his annual report, which, upon motion, was accepted and referred to the Association.

On motion of S. A. D. Sheppard, the following resolution was adopted:

Resolved, That the names of members reported by the Treasurer as in arrears for three years or more and sent to the Permanent Secretary just previous to the publication of the Proceedings for 1895, be dropped from the roll and published in said Proceedings.

The Permanent Secretary submitted his Annual Report, which, on motion, was accepted and directed to take the usual course.

Charles Caspari, Jr., presented the following resolution, and moved its adoption, which was seconded by W. C. Alpers:

Resolved, That a copy of the 1894 issue and all future issues of the Proceedings be sent to the pharmaceutical journals as heretofore.

This was carried after a lengthy discussion.

The Committee on Finance presented the following report through J. E. Morrison:

REPORT OF THE COMMITTEE ON FINANCE.

To the Council of the American Pharmaceutical Association Assembled at Denver, Col., August 14, 1895:

Gentlemen: Your Chairman of the Committee on Finance being on the eve of departure for Europe for a rather lengthy stay, and hence being unable to be present, much to his regret, at the next gathering of our Association, at Denver, Colorado, begs leave to submit the following suggestions on the subject of the administration of our finances, in lieu of a report. The latter he is, unfortunately, prevented from submitting, as the accounts of the Treasurer and Secretary have not as yet been examined and audited, and therefore no exact estimate of our receipts and expenditures can be figured upon; he trusts his fellow-members on the Committee, Messrs. Ramsperger and Morrison, will bear him out in his views after having had an insight into the Treasurer's report.

Whilst unable to give any exact figures on the subject of our receipts and expenditures, your Chairman feels convinced that owing to various large items of expense incurred, which, in his capacity as Chairman of the Finance Committee, he has had to approve for payment, the *bona fide* income of the Association (*i. e.*, the receipts from dues of annual membership) will not cover these expenditures.

In his last report at Asheville he took occasion to draw the attention of the Council to the sound policy of not allowing our expenditures to exceed our income from this source and to allow the income from the life membership and other funds to accumulate and to be used only for extraordinary purposes (as, for instance, the International Pharmaceutical Congress, at Chicago, in 1893), or for purposes of special investigations of interest to pharmacy in general, etc., etc., and also to have it on hand for rainy days, which all associations, as well as individuals, will have to encounter sooner or later. To secure this desirable condition he would suggest:

1st. That hereafter all reports and recommendations made by Presidents, Chairmen of Sections and committees, involving the outlay of large sums, should not be accepted until a fair estimate of the costs of such recommendations, reports, etc., has been submitted to the Council and fully and carefully considered, weighed and passed upon by the latter.

2d. That papers submitted to the different Sections should not be printed until they have been thoroughly examined and approved by either the Chairmen of such Sections or a committee capable of passing on their merits; otherwise such papers should either be read in manuscript or printed at the expense of the author until approved by the Publication Committee.

3d. That in order to avoid unnecessary expense and also the enlarging of our annual Proceedings to an enormous size, as will be the case most probably this year, the report of the Reporter on the Progress of Pharmacy beheld within the limits heretofore observed, and many unnecessary references, excerpts, etc., etc., be hereafter excluded, or certainly condensed.

Appended the Council will find a brief summary of receipts and expenditures of the Association during the years from 1886 to 1893 inclusive, which will be very interesting reading for such as are interested in this vital question of the Association.

This summary was furnished me by the Treasurer of the Association Mr. S. A. D. Sheppard, and is perfectly authentic, taken from the books of the Treasurer.

The Council will note the gradual increase in expenditures from $5259.40 in 1886 to $7853.96 in 1893. Of course our receipts have also increased during that period.

It might perhaps be a judicious move, that the Council set a specific sum, say $7000.00, as the maximum of expenditures from 1895 to '96, and contract the expenditures in the manner indicated in this report to come within this limit.

Respectfully submitted, CHARLES E. DOHME,

Chairman Committee on Finance of American Pharmaceutical Association.

Baltimore, March 6, 1895.

Schedule Showing Annual Expenses of Association.

	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.
Salaries	$2300 00	$2300 00	$3250 00	$2300 00	$1925 00	$2395 00	$1505 00	$2500 00
Premium on Treasurer's Bond	.....	100 00	100 00	95 00	35 00	30 00	25 00	25 00
Traveling Expenses	31 25	47 50	101 25	205 00	85 41 192 30	.....	80 48	134 35
Proceedings	1868 03	1770 10	1860 14	1977 06	2273 71	3000 93	3805 04	3603 75
Stenographer	100 00	150 00	150 00	130 00	109 90 125 00	.....	120 00	125 00
Journals	.....	32 40	25 52	23 72	19 61	17 10	12 38	25 44
General Index	.....	.....	.....	.....	100 00	25 00		
Printing and Stationery	310 15	158 51	253 68	283 85	201 88	240 25	348 25	145 15
Insurance	15 00	.....	15 00	9 00	.....	.....	36 00	10 00
Certificates	.....	105 00	.....	.....	.....	55 00	.....	75 00
Badges	.....	.....	.....	.....	.....	351 50	.....	111 50
Prizes	.....	.....	50 00	.....	.....	.....	125 00	
Committee on Transportation	.....	.....	.....	.....	.....	52 75	130 33	63 04
Committee on Membership	.....	.....	.....	.....	.....	.....	.....	245 42
Auditing Committee	171 24	42 35						
Committee on Drug Market	.....	22 95						
Committee on Metric System	.....	.....	.....	.....	.....	.....	18 63	
Committee of Arrangements	.....	.....	166 51	67 85				
Local Secretary	102 50	236 75	200 00	25 00	247 20			
Section on Scientific Papers	.....	43 10	15 80	332 26	64 06	.....	17 75	24 07
Section on Education and Legislation	.....	.....	.....	.....	8 75 4 75	15 00	15 99	33 05
Section on Commercial Interests	.....	.....	.....	.....	8 50	264 87	87 99	69 33
International Pharm. Congress	.....	.....	.....	.....	.....	.....	206 47	454 67
Miscellaneous	361 23	684 42	578 08	471 99	178 45	203 87	43 12	209 19
Total	$5259 40	$5693 08	$6765 98	$5920 73	$5579 52	$6651 27	$6577 43	$7853 96

Comparison of Amount Received for Members' Dues, and Amount of Annual Expenses, in Those Years of Which We Have a Complete Record.

	1888.	1889.	1890.	1891.	1892.
Amount of Dues Received	$5730 00	$5640 00	$5810 00	$6495 00	$6465 00
Amount of Annual Expenses	6765 98	5920 73	5579 52	6651 27	6577 43

This schedule does not include money from Ebert Fund, or Centennial Fund, or money spent on account of National Formulary.

The figures under 1886 mean amount paid out for Association year 1886, viz., July 1, 1886 to July 1, 1887—those under 1887, amount paid July 1, 1887 to July 1, 1888, and so on.

The several amounts named as cost of Proceedings, '86, '87, '88, '89, would be larger did we know what proportion of the sum charged under "Miscellaneous" for those years was paid for distributing the Proceedings.

The same is also true of Traveling Expenses, 1886 and 1887, and of Insurance for '87, '90 and '91.

To offset the charges for Certificates and Badges on the schedule, the total amount of which is $698.00, the amount received for Certificates and Badges during the years named is $1564.35, thus showiug a gain of $866.35.

On motion of Charles Caspari, Jr., the Finance Committee were instructed to submit a new Rule of Finance, appropriating specified sums for the various expenditures of the Association.

On motion of Wm. C. Alpers it was resolved that the total of the budget to be submitted by the Finance Committee shall in no case exceed the receipts for dues of the preceding year.

C. L. Diehl for the Committee on Publication reported that 1850 copies of the 1894 Proceedings had been printed, 1775 bound in cloth and 75 in paper. The increased cost of the Proceedings for this year was due to the unusual increase in size of the Report on the Progress of Pharmacy and the large number of papers received at Asheville, N. C.

On motion of S. P. Watson it was agreed that Mr. Hallberg be invited to present his Report on the Amendments to the Constitution and By-Laws of the Association to the Council at the next session.

Geo. W. Seabury, Chairman of the Section on Commercial Interests, having asked for more time for the meeting of his Section, it was on motion of C. L. Diehl agreed that the time allotted for the First Session of the Section on Scientific Papers be given to the Commercial Section for its Second Session.

The Treasurer's report was presented and on motion directed to take the usual course.

The Chair appointed Messrs Caspari and Watson a Committee on Credentials with instructions to report direct to the Association.

W. S. Thompson presented his report as Chairman of the Council on the Invested Funds of the Association, which was on motion ordered to take the usual course.

Upon motion, the Minutes were received.

MR. ALEXANDER: Merely accepting the report does not adopt these resolutions that have been presented, as I understand it.

THE PRESIDENT: No, sir, it does not. If you accept the report you do not necessarily adopt the resolutions.

DR. WHELPLEY: The question has been asked whether the accepting or receiving of the Minutes of the Council means the adoption of them. It is necessary to know this. If they have not been adopted I move you that we adopt them. (Seconded.)

MR. TORBERT: I would like to inquire whether the action of the Council with reference to the time that the meeting is to be held will be binding upon this Association if adopted, and if as a result of its adoption we shall meet in June next year. Is that correct ?

THE PRESIDENT: No, sir. As I understand it, that is simply a reading of the action of the Council last year. The Association adjourned to meet in June, but that proposition was not favorably received, and afterwards the Council was asked to change the meeting to a later date, which they did, and set the time August 14th, the present date

MR. LEIS: I find there is a clause in the resolution which reads that the expenditures shall not exceed the receipts of the meeting. Now, how can we tell what the expenditures will be, and can we regulate these expenditures to the amount of the receipts of the meeting ? What will we do with what we cannot pay, if we don't receive enough from the proceeds, extra dues, etc., from the meeting ?

MR. REMINGTON: I think possibly my friend Leis misunderstood one little point about that resolution. If I understand it properly, it was that the dues of the preceding year should not be exhausted—and this amount is a known quantity.

MR. SEABURY: Mr. President, if I understand one of these resolutions passed by the Council accurately, then I would move to amend it. I believe it reads that all members in arrears for three years be dropped from the roll and their names published in the Proceedings. For one I object to that, for the reason that Pharmacy in the last eight or ten years has been in such a position that a great many of the most earnest and active members in the past have not been able to pay their annual dues; and if you drop them

from the list that is certainly sufficient, without publishing the fact that Pharmacy has become so impoverished that they must be set before the world as delinquent in the payment of their annual dues. I object to that.

DR. BARTLEY: I would suggest that these resolutions be taken up one at a time and discussed in that way. I make that as a motion.

DR. WHELPLEY: I certainly hope that motion will not prevail. The sole purpose of the Council is to facilitate business, and this is the first time in my recollection in the history of the Association that the action of the Council has not been adopted without more than a few questions inquiring into what we have a right to inquire into, but I hope the whole series of resolutions will not be taken up *seriatim* and discussed *ad libitum*.

THE PRESIDENT: It has been moved and seconded that the resolutions of the Council, as read, be taken up *seriatim* and considered. Are you ready for the question?

MR. HECHLER: I believe that the resolutions were not properly understood, and I myself did not thoroughly understand them when they were read; and I believe if they were re-read and properly understood, that there would not be a dissenting vote. I ask that they be re-read.

MR. THOMPSON: I believe as has been suggested by the gentleman who has just taken his seat, that the resolutions were not exactly understood by the members. One of them was that the Finance Committee be instructed to present to the Council a rule which shall provide that the expenses of the Association shall be kept within its income. Now you don't resolve that this thing should be done, nor that it is done, but that they instruct the Committee to present such a matter for their action at some future time. That was one of the resolutions. The other was a resolution offered by Mr. Alpers which instructed this committee to provide in its by-laws that the expenses of the Association shall not exceed its income from membership dues for the year preceding. Now both of these resolutions are simply pending. They do not accomplish anything. They do not permit either the Association or the Council to do anything as yet. The other point to which Mr. Seabury refers was a resolution merely carrying out an existing by-law of the Association which obliges you to drop a member when he is in arrears for dues for three years. This is all there is in the three resolutions.

MR. SEABURY: I may be in error, Mr. President, but I understood that these names were also to be published in the Proceedings. If that is not the case, I withdraw my motion.

THE SECRETARY: I should like to say for the information of Mr. Seabury and the other members, that it has been customary to publish in the Proceedings the names of members dropped for non-payment of dues, for a number of years; the Proceedings for 1894 show such a list.

MR. SEABURY: Then we understand that these names will not be published in the Proceedings?

THE SECRETARY: They have been published heretofore, and they will be published again this year, unless the action of the Council be not concurred in.

MR. SEABURY: Then I will move that these names be not published in the Proceedings, but simply dropped from the list, and I also desire to give notice of the proposed change in the by-laws to that effect.

MR. ALEXANDER: I don't think that is exactly in order. I think a motion to refer it

back to the Council, and ask them to change that matter so that the names shall not be published in the Proceedings, would be more proper.

MR. SEABURY: I will accept that suggestion and make it a part of my motion.

DR. WHELPLEY: This motion will no doubt serve the purpose, but I think that simply a motion to request the Secretary to omit the names will be all that is necessary.

MR. EBERT: I think it is no more than right and proper that the list of names of those who are dropped from the list of active members be published in the Proceedings. We have done so ever since the foundation of this Association, and it is no more than proper that it should so continue; because otherwise the Secretary's list, as well as that of the Treasurer, would be very incomplete. There would be no published record that any man has been dropped from the list, and the officers of this Association would be continually receiving letters from men demanding an explanation why their names did not appear in the Proceedings; I think it is no more than proper that the names of those who are dropped from this Association be published in the Proceedings. That is business.

MR. ALEXANDER: I don't agree with Mr. Ebert at all on that question. I agree with Mr. Seabury entirely. The same result is reached when the names are simply dropped from the roll of members, and all will know the reason why they are dropped. If they do not pay their dues they know they cannot remain a member of the Association, and I see no necessity for publishing their names. It seems to me sufficient if the members be notified that they have been dropped.

MR. SAYRE: It seems to me the report is incomplete and only partial, as I understand it. Let us wait until we get the complete report of the Council, and then, if we choose, we can have these resolutions re-read; we will then have time to think them over, and can act perhaps a little more intelligently. I hope to see the proceedings of this Association advance this afternoon, and not be clogged by an unnecessary discussion. (Applause.)

MR. HALLBERG: The Council, I believe, will to-morrow pass upon the revision of the Constitution and By-laws, and therefore a reference of this matter to the Council would be the proper course, and it could be attended to to-morrow in their revision of the Constitution and By-laws.

DR. BARTLEY: I withdraw my motion, which has apparently been forgotten, to take up these resolutions one by one.

The question being called for upon the motion of Mr. Alexander to re-refer this matter to the Council, with the request that the names of the delinquent members be not published in the Proceedings, a vote was taken and the motion adopted.

Upon motion of Mr. Good, the minutes of the sixth session of the Council were then adopted as corrected.

Secretary Kennedy then read the report of the Council on the invested funds of the Association, giving the following information:

REPORT OF CHAIRMAN OF COUNCIL ON INVESTED FUNDS.

To the American Pharmaceutical Association:

The invested funds of the Association, in possession of the Chairman of the Council at the close of the fiscal year June 30, 1895, consist of

Ebert Fund.

U. S. Registered 4 per cent. bond No. 160,603	$100 00	
" " " " 67,880	500 00	
Add premium of 10 per cent.	60 00	
Cash in Strafford Savings Bank, Dover, N. H.	117 47	
		$777 47

Centennial Fund.

U. S. Registered 4 per cent. bond No. 145,640	$1000 00	
" " " " 160,604	100 00	
Add premium of 10 per cent.	110 00	
Cash in Strafford Savings Bank, Dover, N. H.	239 42	
		1449 42

Life Membership Fund.

Nine (9) U. S. Registered 4 per cent. bonds Nos. 145,639, 145,761, 145,762, 150,826, 150,827, 150,828, 164,185, 164,889, 173,049, each for $1000.00	$9000 00	
Add premium of 10 per cent.	900 00	
Cash in Strafford Savings Bank, Dover, N. H.	1033 27	
		10933 27

General Fund.

Three (3) American Security & Trust Co's. 5 per cent. debenture bonds Nos. 26, 27, 28, each for $1000.00		3000 00
Total value of invested funds		$16160 16

The investments remain precisely as reported to you last year; the increase ($536.50) in the total is from the interest and payment of Life Membership fees.

The premium on the bonds has been reckoned at 10 per cent. as at last report.

The interest on all the securities is paid up to date (June 30, 1895).

W. S. THOMPSON, *Chairman of Council.*

Washington, D. C., July 1, 1895.

MR. KENNEDY: I have been directed by the Council to present 216 names as applicants for membership to the American Pharmaceutical Association:

Upon motion, the Secretary was instructed to follow the course laid down in the By-laws of the Association, and post the names of the applicants in a conspicuous place during the meeting of the Association.

Under the next order of business the President called for the Reports of Committees.

The following committees handed in their reports, which were read by title and the further consideration of same deferred until the next session:

The Committee on the Revision of the Pharmacopœia.—Leo Eliel, Chairman.

Committee on General Prizes.—William Simon, Chairman.

Committee on Ebert Prize.—Charles Rice, Chairman.

Special Committee on the Status of Pharmacists in the Army and Navy of the United States.—Geo. F. Payne, Chairman.

Committee on National Formulary.—C. Lewis Diehl, Chairman.

Delegates to the Section on Materia Medica and Pharmacy of the American Medical Association.—W. S. Thompson, Chairman.

Mr. Watson then read the following report, which on motion was accepted and adopted:

The Committee on Credentials, appointed by the Council, beg leave to report that they have performed the duty assigned them, and find that delegates have been duly accredited to this meeting from 53 organizations, as follows:

Colleges of Pharmacy.—Chicago, Cincinnati, Louisville, Maryland, Massachusetts, Montreal, National, New York, Philadelphia, Pittsburg, St. Louis.

State Pharmaceutical Associations.—Alabama, Colorado, Connecticut, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Pennsylvania, Rhode Island, South Dakota, Tennessee, Texas, Virginia, Wisconsin.

Alumni Associations of Colleges of Pharmacy.—Chicago, Maryland, Northwestern University, Philadelphia, St. Louis.

Schools of Pharmacy.—University of Iowa, University of Michigan, Northwestern University.

Local Associations.—Chicago Retail Druggists' Association, Kings County Pharmaceutical Society, New York German Apothecaries' Society, Pharmaceutical Association of the Province of Quebec.

Medical Associations.—American Medical Association.

Wholesale Druggists' Associations.—National.

Signed, S. P. WATSON,
CHAS. CASPARI, JR.

After a five minutes' recess the Convention proceeded to a roll-call of the states for the purpose of selecting members of the Nominating Committee, with the following result:

Alabama—E. C. Andrews.
Arkansas—E. F. Klein.
Colorado—John Best and C. H. Wells.
Florida—S. P. Watson.
Georgia—Joseph Jacobs and J. A. Solomon.
Illinois—Walter M. Semple and Chas. Zimmerman.
Indiana—Frank H. Carter and Chas W. Eichrodt.
Iowa—Fletcher Howard and C. D. Wangler.
Kansas—Mrs. M. O. Miner and Geo. Leis.
Kentucky—Albert J. Shroettlein and Addison Dimmett.
Louisiana—N. P. Roux and L. F. Chalin.
Maryland—Charles Caspari, Jr., and Alfred R. L. Dohme.
Massachusetts—E. H. La Pierre and S. A. D. Sheppard.
Michigan—C. C. Sherrard and Geo. McDonald.
Minnesota—W. A. Frost and L. A. Harding.
Missouri—Adolph Brandenberger and H. M. Whelpley.
Nebraska—Charles R. Sherman and Norman A. Kuhn.
New Jersey—S. W. Williams and W. C. Alpers.
New York—E. H. Bartley and Clay W. Holmes.
North Carolina—O. M. Royster and John W. MacRea.
North Dakota—J. Davison.

Ohio—C. T. P. Fennel and Geo. L. Hechler.
Pennsylvania—E. A. Cornell and F. G. Ryan.
South Carolina—F. T. Wilhite.
Texas—J. Burgheim.
Virginia—T. Roberts Baker.
District of Columbia—W. S. Thompson.
Province of Quebec.—J. E. Morrison.

As delegates at large on the Nominating Committee, the President appointed Albert E. Ebert, of Illinois; J. P. Remington, of Pennsylvania; M. W. Alexander, of Missouri; W. J. M. Gordon, of Ohio, and J. N. Hurty, of Indiana.

As a committee on the time and place of next meeting the Chair appointed William A. Frost, of Minnesota; J. E. Morrison, of Montreal, Canada; W. S. Thompson, of the District of Columbia; S. P. Watson, of Georgia, and Louis F. Chalin, of Louisiana. Mr. Chalin resigned from this Committee and suggested the appointment in his place of J. A. Legendre, of Louisiana, which substitution was accepted by the President.

Pending the call of the States as given above, the following discussion arose:

MR. EBERT: The statement has just been made that the members of this Nominating Committee must be members of the Association. It is not necessary that they should be actual members of the Association, but if they are delegates to this Convention by virtue of that fact they are members of the Association at this meeting, and they therefore represent their States in the Nominating Committee.

DR. WHELPLEY: I would like to see the law for that statement.

MR. KENNEDY: I think Mr. Ebert is correct in regard to that. By simply handing in their credentials and signing the Constitution, without being elected members of the Association, they become members of the Association.

DR. WHELPLEY: It is necessary for them to sign the Constitution and By-Laws.

MR. ELIEL: That has not been the custom of this Association in years gone by; I became a member of this Association from the fact that I came to the Association as a delegate from our State Association. I did not have to sign the Constitution and By-Laws, and I was a member of the Nominating Committee in 1882 and did not complete my membership until after that session. This question was not raised then, nor has it ever been raised since that time, and I do not think it ought to be raised now, because it would be entirely out of place.

MR. TORBERT: I would like to confirm what Mr. Eliel says regarding the members that are present in this body and whose presence this Association has invited. The uniform practice, so far as my knowledge is concerned, has been that an accredited delegate to this Association has always been entitled to appointment on the Nominating Committee. As Mr. Eliel has stated in reference to himself, that was the fact in my own case the first meeting I attended.

MR. REMINGTON: I think we ought to strictly follow the By-Laws, irrespective of any sentiment we may have on the subject. I will ask the Secretary to read the two sections which bear on this point. It is a very important matter, and we should go about it right.

The Secretary read Articles 5, 7 and 8 of Chapter 9 of the By-Laws, relating to membership, and Mr. Alexander said:

It resolves itself into just this one fact: that every delegate who comes to this Convention and signs the Constitution and pays his fee is a member, and he is not a member unless he does this. Therefore, delegates who come here without signing the Constitution, representing some local association or some college in this Convention, without signing the Constitution and paying their fees, are not members.

DR. WHELPLEY: If I may be permitted, I will read from the By-Laws, Section 6: "Members shall be entitled, on the payment of five dollars, to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, Permanent Secretary and Treasurer."

MR. GOOD: I would ask if it is not possible for delegates to complete their membership if they are appointed. Has the Secretary a copy of the Constitution and By-Laws that they can sign?

THE SECRETARY; Not lying right here on the table; but it can be produced in a few minutes.

MR. REMINGTON: I would like to say in regard to that, that when a member signs the Constitution and By-Laws he signs the blank referring to it. Doesn't he complete his membership when he signs that? Do you always have him sign the Constitution? Doesn't that blank take the place of the Constitution?

DR. WHELPLEY: The delegates to the American Pharmaceutical Association have this privilege over and above those pharmacists who are not delegates or members. They can become members of the Association at or even before the opening of the session, or as soon as their credentials are accepted, by signing the Constitution, or signing one of these blanks which amounts to the same thing, and paying five dollars. Any one else must first have his application presented to the Council and read before the convention and laid over until the following session before he can become a member. Or, in other words, delegates can make themselves members in a few minntes, and other people must wait until the second session of the Association.

MR. KENNEDY: In the book of Constitution and By-Laws here, there is a copy of the Constitution and By-Laws which they can sign, and which answers every purpose, because it is full and complete, and by cutting that out—which has been done before—and pasting it in a book kept for that purpose, the signing of that paper would certainly be the signing of the Constitution and By-Laws. This has been done until the last few years. As soon as a delegate who was not a member of this Association wanted to become a member at once, instead of being elected by the Association, Professor Maisch, the former Secretary, handed me the name and I simply filled out the blank, and the delegate paid me five dollars and signed this blank, which went to show that he had complied with the Constitution by signing it, and he was certainly a member of this Association, having signed the Constitution and paid the fee.

MR. ALEXANDER: I believe this, that in getting men on our Committees to make officers for us, they should be members of this Association, and they should not be appointed now, if they are not members, just because of the fact that they are going to be members. Let them become members of the Association before they begin to legislate for us who have been here year after year. I do not object to the new men, but I want them in the Association before they begin to legislate for us.

MR. THOMPSON: From what has been said and read here, it is very plain that a man may appear here and enjoy the rights and privileges of this meeting in two capacities; one is that of a member, and the other is that of a representative of some pharmaceutical

body. The Constitution says that any organized body of pharmacists shall be entitled to so many delegates to this Association, whether they are members or not. Their credentials are presented here, and if in proper form they are received by us as delegates, and being received, are certainly entitled to all the rights and privileges of such delegates. Now at the same time, this same Constitution merely gives them this additional privilege—that if they desire to become members, of their own volition, they may do so without going through the scrutiny of the ballot box and the scrutiny of the Council. But it is very plain that if our Constitution intended that the legislation for this body should be in the hands of members only, it would have stated that those delegates coming here were not entitled to speak, were not entitled to vote, and they would be received here as non-entities. This is the light in which you place them if you undertake to say now that they have no right on this Nominating Committee, and are not entitled to act unless they are members. Certainly we never intended that. So far as my memory goes, the question has never been raised before, and it is of course a very delicate one for delegates here who perhaps may not contemplate becoming members of the Association. We are glad to have them with us. There may be only one or two from some of the societies, and if they are not enough pleased with us to become members I would rather not force them to become members and pay the five dollars and sign the Constitution and By-Laws.

MR. SEABURY: The status of the delegate has always given him in this and other conventions nothing more nor less than the privileges of the floor. This is all he is entitled to, and he is not entitled to any other rights unless he conforms to the provisions of the Constitution and By-Laws of the Association. I question the propriety of allowing non-members on the Nominating Committee to elect our officers. They ought to know something about the Association and the workers in it when selecting the officers. If I had anything to do with the revision of the Constitution and By-Laws, I should favor amending that particular section so that a member should not be eligible to the Nominating Committee until the next annual meeting following his election as a member.

MR. ALPERS: It has been stated that it would be indelicate for us to withdraw the right of being a member of the Nominating Committee from a delegate. I reply to that by asking whether it is not much more indelicate for a man to come here and claim the right of making nominations for a Society of which he is not a member, and of whose purpose he knows absolutely nothing? (Applause.)

MR. REMINGTON: The only point is that this is not a subject of debate. It is all here in our By-Laws, and we cannot get away from them: "The President shall call the roll of States represented and request each State in turn to appoint two members." Now if these delegates have completed their membership and paid five dollars and signed the Constitution they are members; until they have done so they have no right on the Nominating Committee. That is the whole story.

DR. WHELPLEY: We can dispose of this matter very easily if the Chair will ask any delegates who are present and desire to become members to step up and sign the Constitution and By-Laws and pay their five dollars.

THE PRESIDENT: As the By-Laws now stand, the Chair would have to rule that no one is eligible to appointment on the Nominating Committee except those who are members; and to obviate this, as Dr. Whelpley has suggested, it would be in order for any delegates who desire to become members to complete their membership before the appointment of this Committee.

MR. KUHN: I move that this Nominating Committee leave blank in their report

the office of President, to be filled by ballot in the session of the Association. There are a number of candidates in the field—not candidates, but persons who have been mentioned by their friends—and I think it is only right in a representative body of this kind that every one should have a vote in it. I think it is an important office, and therefore I make that motion.

MR. TORBERT: I rise to a point of order: that this motion is clearly out of order, because it conflicts directly with the Constitution.

THE PRESIDENT: The point of order is well taken. The Chair rules that the motion is out of order.

The Secretary then read the following invitations for holding the next annual meeting:

MONTREAL, July 3, 1895.

CHAS. CASPARI, JUN., ESQ., *Permanent Secretary American Pharmaceutical Association, Dear Sir:* I am instructed by the Council of the Pharmaceutical Association of the Province of Quebec and the Board of the Montreal College of Pharmacy, on their joint behalf, to extend to the American Pharmaceutical Association a very cordial invitation to hold their next annual meeting in the city of Montreal. I need not expatiate upon the beauties of our city and its surroundings, but will leave that duty to our representatives, Messrs. Morrison and Muir, who expect to be present at your meeting in Denver as delegates. I can, however, assure you that should Montreal be selected, the pharmacists of this city and Province will give your members a right royal welcome. Temporary arrangements have been made with our leading hotels for reduced rates, and we have assurances from the railway companies that they will grant the usual concessions. I also desire to inform you that should our invitation be accepted Mr. Joseph E. Morrison has been selected to fill the position of local secretary.

With kindly greetings, believe me, yours truly,

E. MUIR, *Secretary.*

MONTREAL, *August* 18, 1895.

MR. CHAS. CASPARI, JR.. *Permanent Secretary American Pharmaceutical Association, Denver:*

Dear Sir: Will you kindly allow me, on behalf of the citizens of Montreal, to invite your important Association to hold their next reunion in our city?

We would feel highly honored if you were to visit us in 1896, and I earnestly trust that you will accept this invitation.

Yours very truly, I. O. VILLENEUVE, *Mayor.*

THE MONTREAL BOARD OF TRADE, MONTREAL, *August* 9, 1895.

To the President and Members of the American Pharmaceutical Association:

Gentlemen: The Council of this Board, having heard that your Association might favorably consider a proposal to hold its next Annual Meeting in this city, hereby tenders you a cordial invitation to do so.

Assuring you of a hearty welcome should you decide to visit Montreal, we are, gentlemen,

Yours very truly, JAS. A. CAUTHE, *President.*

GEO. HADRILL, *Secretary.*

MONTREAL, *August* 9, 1895.

To the Members of the American Pharmaceutical Association, Denver, Colorado:

Gentlemen: "La Chambre de Commerce du District de Montreal" respectfully claims

the favor of your holding your Annual Convention for the year 1896 in the city of Montreal, Canada.

Mr. J. E. Morrison is duly authorized to present the above invitation.

By order, S. COTÉ, *Secretary*,

HOT SPRINGS, ARK., *August* 10, 1895.

On behalf of the Business Men's Club I am authorized to extend a sincere and cordial invitation to the American Pharmaceutical Association to hold their next Annual Meeting at the city of Hot Springs, Ark.,—the world's greatest sanitarium and pleasure resort combined—as we think, and as our country at large is fast realizing.

We earnestly join with others of our community and with the representatives of our city to your Association, who will present this, in urging your careful consideration of this invitation, assuring you that, if accepted, we will make your visit both pleasant and instructive.

With considerations of high regard, I am

Very respectfully your servant, CHAS. N. RIX, *President.*

OWATONNA, MINN, *August* 7, 1895.

To the American Pharmaceutical Association, Denver, Colorado :

The Minnesota State Pharmaceutical Association extends a most cordial invitation to your Association to hold its next Annual Meeting, that of 1896, in our State at Lake Minnetonka. According to a resolution passed at our last meeting, June 12, 1895.

Respectfully yours, WM. GAUSEWITZ, *President.*

MINNEAPOLIS, MINN, *August* 10, 1895.

American Pharmaceutical Association, in Convention Assembled at Denver :

The Twin Cities extend greetings and cordially invite your honorable body to hold the 1896 Convention in the dual metropolis of the Northwest, St. Paul and Minneapolis. We can assure you a cordial welcome and generous entertainment.

Lake Minnetonka, the fairest gem of all Nature's handiwork, offers attractions unequaled for health and recreation, as well as a convenient point at which to hold the business sessions of your Convention,

Yours very truly, W. J. FOOTNER,
J. F. CALDERWOOD,
Presidents Twin City Commercial Clubs.

ROBERT A. SMITH, *Mayor St. Paul.*
ROBT. PRATT, *Mayor Minneapolis.*

Upon motion of Mr. Remington the invitations were received and referred to the Committee on Time and Place of Holding Next Meeting.

The Secretary announced that the Nominating Committee would meet immediately after the adjournment of the general session.

The report of the Treasurer being handed in, upon motion of Mr. Diehl, its consideration was deferred until the session of the following morning, and the session having then extended until nearly seven o'clock, Mr. Remington moved an adjournment until Thursday at 10 o'clock a. m., which motion prevailed.

Second Session, Thursday Morning, August 15, 1895.

The Convention was called to order with President Simpson in the Chair, and the minutes of the preceding session were read and approved.

Secretary Kennedy read the minutes of the seventh session of the Council, as follows:

The Secretary reported that the Minutes of the last session of the Council had been adopted by the Association, excepting that portion relating to Dropped Delinquent Members. That subject having been referred back to Council with instructions that the Secretary shall not publish the names of delinquent members in the Proceedings, it was after thorough discussion agreed, on motion of S. A. D. Sheppard, that the Council adhere to its former action, believing it to be for the best interests of the Association.

The Secretary presented 17 names of applicants for membership, which on motion were directed to take the usual course.

The Secretary read the following Report of the Committee on General Prizes, which on motion was referred to the Association.

To the Council of the American Pharmaceutical Association:

Your Committee on Prize Essays, appointed at the Asheville meeting, begs leave to submit the following report:

Having carefully and critically examined the scientific papers published in the Proceedings of the Association for 1894, and having first eliminated such papers as were handed in by non-members of the Association, we recommend to you the awarding of prizes as follows:

Henry Kraemer.—First prize for his paper on "Microscopical and Chemical Examination of Cloves."

Alfred R. L. Dohme.—Second prize for his contributions to the chemistry and pharmacognosy of Ipecac and Stramonium, as reported in his communications entitled "Additional Experiments with Datura Stramonium" and "Relative Value of Two Kinds of Ipecac Root."

L. F. Kebler.—Third prize for his paper on "Analytical Alkalcidal Chemistry."

Respectfully submitted,

W. Simon,
Joseph P. Remington,
W. L. Scoville.

Mr. Hallberg, upon invitation, presented the proposed changes to the Constitution and By-Laws. Upon motion, it was agreed to present them to the Association.

Mr. Alexander: As I understand it, the Council refuses to accept the suggestion of the convention; I move, therefore, that so much of the minutes just read as refers to the names of members being dropped from the roll after three years of non-payment of dues, be again referred back to the Council with instructions not to publish these names in the Proceedings. (Seconded.)

Mr. Sheppard: As I made that motion in the Council, I think I ought to explain my position in the matter. I think I could have made it plain yesterday to the Association. I am very sure if any one should serve as Treasurer for the term of five years, he would be fully convinced that it was a most wise and proper thing for these names to be published. The first reason is, that otherwise our list of dropped members will increase, I have no doubt, in the first two years, fifty per cent. It is one of the very best means of making a man pay up and resign. Secondly, in an Association like this, where the membership is gathered up in a somewhat hasty manner, it is an absolute certainty that

we get among our list of members a great many men who are not first-class men so far as carefulness, financial action, and general attendance to business is concerned. A great many men come into the Association simply for the advertisement. I say that advisedly, Mr. President. Many men join this Association and hold their membership for one year, and get a certificate of membership, hang it up in their stores, and then for three years afterwards are advertised in our printed list as members; they thereby get four years' advertising as members of the great American Pharmaceutical Association. This certificate they hang up in their stores, and pay no attention to the bills from the Treasurer. No man is ever dropped until he has been written to more than once, and the last letter that is sent to him is a very strong one; and I say, gentlemen, that it is simply justice to the Association that that class of men be dropped. Of course, occasionally, there is a man who does not deserve to be described as I have stated, but I think that the majority of these men who are finally dropped are of that class. And then again, I think there is another point. Our Proceedings should be a record of our action. Every man should be able to take the Proceedings of the Association from one year to another, and tell exactly what the status of the members has been, as well as of the action we have taken. The personality of our members is a very important factor in our work. And right along that line, you will remember, many of you, that there has for a number of years been published in the Proceedings a list of the payments made by the members from one year to another, so that we can tell just when every man pays his dues. Every man can audit his own account against the Treasurer. So that if a man looks up the account of John H. Brown, he is able to tell whether he has been a regular member or whether he has been one of the slip-shod men. I think that the question of the record alone should outweigh the question of sentiment. It is not an injustice to these men. We are not doing them any wrong. No one of them is ever dropped without abundant notice,—more than that, very abundant notice,—and I think we do this Association a great injustice, if we stop that action which we have been carrying on so many years and with no sort of difficulty. It has never caused us any trouble. Why stop it? It has done us a great deal of good, and never done harm. (Applause.)

MR. EBERT: I am very glad that we have with us to-day Mr. Sheppard, who can explain the situation. It is just exactly as I have always understood it, and especially that part as to the financial proceedings; and for that reason it should be done. Certainly our financial matters pertain to our business, and I do hope that the Council will be sustained. I am glad to see that I am going to be seconded to-day, and be able to say "I told you so yesterday."

MR. ALEXANDER: While I realize the force of the Treasurer's remarks, there is something due to sentiment after all. Sentiment occupies a large place in our hearts to-day, and particularly with regard to the druggists throughout the whole country. There are many men who think, when they are called upon to pay their annual dues of $5.00, "I can't pay it this year, but I will be able to make it up next year." But next year comes along, business is a little bit worse than it was the year before, and so it goes along until the three years are up, and these men are dropped; they can't pay up. It is not because they do not want to pay it in many cases. I am speaking particularly about these hard times. Under ordinary circumstances I think it is all right: but what particular good it will do to publish these names—except as the matter of record is concerned, which I will admit and acknowledge is an important feature—but I say there is something due to these men, and their names should not be published as being too poor to pay their dues. That is the point I wanted to make, Mr. President; but I will withdraw my resolution referring that back, because I acknowledge the force of the Treasurer's remarks. (Applause.)

The motion of Mr. Alexander having been withdrawn, the question recurred upon the adoption of the Minntes as read by Secretary Kennedy, and they were unanimously approved as read.

Upon motion of Mr. Kennedy, the Secretary of the Committee on Membership was instructed to invite the applicants for membership who were presented at the former session, to complete their membership by signing the blank provided for that purpose and paying their dues.

Mr. Kennedy, Secretary of the Council, here reported seventeen applications for membership, which followed the usual course of being posted in a conspicuous place in the hall, subject to the further action of the convention.

The Permanent Secretary then read the following:

REPORT OF FINANCIAL ACCOUNTS IN THE CARE OF THE PERMANENT SECRETARY.

A. Receipts and Expenses on account of National Formulary from July 1, 1894, to June 30, 1895.

1. *Receipts.*

From sales and payment of bills due July 1, 1894		$278 39

2. *Expenses.*

Printing 500 copies	$35 00	
Binding 500 copies	75 00	
Extra for binding 15 copies, sheep and interleaved	2 60	
Expressage and postage	32 05	
		$139 65

3. *Remittances.*

To Treasurer, as per Treasurer's receipts:		
J. P. Remington's accounts	$26 59	
Chas. Caspari, Jr.'s, accounts	251 80	
		$278 39

4. *Sales.*

To dealers, as per ledger accounts	$275 28

5. *Accounts Unpaid.*

By dealers	$51 11

6. *Bills Due by the Association.*

For expressage and postage	$1 33

7. *Stock on Hand.*

Copies in cloth	112	
Copies in cloth interleaved	9	
Copies in sheep	3	
		124

8. *Summary of Total Receipts and Expenses.*

Receipts to June 30, 1894 (see Proceedings, Vol. 42, page 36)	$8113 37	
Receipts from July 1, 1894, to June 30, 1895	278 39	
		$8391 76
Expenses to June 30, 1894 (see Proceedings, Vol. 42, page 36)	$4945 08	
Expenses from July 1, 1894, to June 30, 1895	139 65	
		5084 73

B. Sale of Proceedings.

From July 1, 1894, to June 30, 1895, 4 copies, aggregating		$19 20
Remitted to Treasurer, as per Treasurer's receipt		19 20

C. Account of Badges and Bars.

July 1, 1894, on hand as per Secretary's report—Badges		53
Bars	27	
September, 1894, received at Asheville, do	53	
		80
Badges sold from July 1, 1894, to June 30, 1895	18	$36 00
Bars, do do do	53	26 50
Remitted to Treasurer, as per Treasurer's receipt		$62 50
Balance on hand June 30, 1895—Badges	35	
Bars	27	
Total receipts from sale of badges and bars to June 30, 1894		407 60
Total receipts from sale of badges and bars from July 1, 1894, to June 30, 1895.		62 50
		$470 10
Total cost to June 30, 1895 (see Proceedings, Vol. 42, page 36)		455 00
Total cash profit		$15 10

Chas. Caspari, Jr.,
Permanent Secretary.

Baltimore, July 1, 1895.

In addition to the written report submitted by the Secretary, he gave a statement of the condition of the library owned by the Association, and stated that instead of there being 10,000 volumes, as many of the members had thought, there were only about 280 unbound volumes, and about the same number of bound volumes; that the series were very incomplete, to the extent that in some cases ten or twelve years were missing; that the books had been packed and stored where they could be easily reached if wanted. He asked the members what they desired to be done in regard to these books, and whether or not storage should be paid on them and the books kept in their present incomplete condition, or whether those which were incomplete should be disposed of in some way.

Mr. Diehl: I think, lest there might be some misapprehension created among some of the members, I can explain why many of those sets of serials are incomplete. During the incumbency of Professor Maisch the library of the American Pharmaceutical Association was largely made up of exchanges, and the foreign journals and many other journals would send their journals to the American Pharmaceutical Association for a time, and then, for some reason or other, they would be discontinued, and Prof. Maisch probably did not care to keep many of them up. Many of them have discontinued publication, and the sets are comparatively worthless.

The Secretary: I have no doubt that is the solution of the matter, because during the past year I find that exchanges have not come in as regularly as they should have come in, and if that has been going on for years, it probably accounts for the absence of many of the volumes.

At the last meeting the Secretary was instructed to send certain notices to the journals, stating to them that it would be agreeable to receive their publications. I sent out, on the 15th of November, a letter to all of the pharmaceutical journals of this country, re-receiving favorable replies from many, and—although some did not send a special notice—I think the Reporter received all the papers that were applied for.

The Secretary was also instructed to send a letter to the different State Associations and Boards of Pharmacy, asking for action on certain resolutions adopted at Asheville. These resolutions you are familiar with. They refer to the matter of apprenticeship, and appear in our Proceedings. They were presented, I think, by our President at Asheville, and were adopted there, and the Secretary was instructed to send a copy to the different Boards of Pharmacy and State Associations. The letter which I sent out elicited very few responses. I think something like 90 or 100 letters were sent out, and but about five or six responses were received, stating that action had been taken by the State Associations. Whether action was taken, favorably or unfavorably, by the other associations, I do not know. I have only answers from five or six, all reporting favorable action. In some cases the action of the State Association in the matter had preceded that of the National Association in adopting such resolutions.

Another matter which I think should come before the Association is the following: You are aware that the Committee appointed by the Council last year to revise the complimentary list, decided that pharmaceutical journals should not receive the Proceedings of 1894. The subject was discussed yesterday at the Council meeting, and a resolution covering that point was passed. Some of the strictures indulged in by the Journals, regarding the action of the Association, were not of a very pleasant character. Some were offensive, and one or two, in particular, I thought called for a reply. I am sorry to say that the official organ of a foreign association indulged in some unsavory remarks. Before sending a reply to the editor of this Journal, I submitted my letter to the Chairman of the Council so that it might go with official approval. After having been approved by the Chairman the letter was mailed. No reply has been received as yet. The Pharmaceutical Society of Great Britain, an association standing very high, and being on the best terms of friendship with our organization, is probably not aware of this action of its editor. On page 1159 of the "Pharmaceutical Journal and Transactions" for 1895, there appear some remarks, the last few lines of which read: "Moreover, no formal notice of the change appears to have been sent out to the journals interested, so that the arrangement savors somewhat of obtaining goods under false pretenses."

This journal is the official organ of the British Pharmaceutical Society, I am sorry to say, but I am confident that these remarks were not sanctioned by the Society. It was probably the hasty action of the editor, and the following letter was sent to him on the 25th of July:

BALTIMORE, *July* 25, 1895.

To the Editor of the Pharmaceutical Journal, London, England:

My Dear Sir: On page 1159 of the June issue of the Pharmaceutical Journal, there occur some remarkable words of censure against the American Pharmaceutical Association. I am greatly surprised that such language should appear in the official organ of the Pharmaceutical Society of Great Britain, since the American Pharmaceutical Association has always treated the Pharmaceutical Society with becoming courtesy, and regularly forwarded a copy of the Annual Proceedings to each of the three branches of the Society at London, Edinburgh and Dublin. When the Committee decided to discontinue the issue of the Proceedings to foreign and domestic pharmaceutical journals, I took steps to have all foreign journals properly paid for, and should have offered our subscription to the Pharmaceutical Journal likewise, had I not felt some delicacy in doing so, as I assumed that the Journal was officially sent by the Pharmaceutical Society in recognition of the receipt of the Proceedings. If, however, I was mistaken, and the Pharmaceutical Journal is a private enterprise, kindly notify me of the fact, and I shall be glad to remit the amount of subscription.

The insinuation made by the Pharmaceutical Journal that the American Pharmaceutical Association is endeavorlng to obtain goods under false pretenses, is, to say the least of it, unmerited and ill-advised, and I

am sure does not receive the approval of the Pharmaceutical Society of Great Britain, or British pharmacists in general.

Yours very respectfully,

CHAS. CASPARI, JR.
Permanent Secretary.

That letter was sent to the editor, and I suppose will be replied to shortly. I did not think we could afford to have the imputation rest on the Association, that we were trying to obtain goods under false pretenses. Another unpleasant stricture appeared in one of our American journals, to which I replied. Probably the best way to settle that matter is to say that the editors of that particular journal have since retracted all they said, which was probably the shortest way out of the difficulty.

This report, while partially verbally made, I felt was due the Association, because the Association should be kept posted as to the action of its officers in every detail. And what has been done was not done in any spirit of unfriendliness, but simply as a duty which I felt my office demanded. If I have erred in this matter, of course it is for the Association to condemn the step; but upon consultation with the other officers, I found they were of the same opinion as myself. The action taken by some other American journals did not call for any special action upon my part; both the editors, and in some cases the publishers, although they had received copies of the Proceedings, yet wanted another copy for office use. I make this statement to show that the demands were not altogether fair. I think that completes the full report.

Upon motion of Mr. Alexander, the report of the Secretary was received and referred to the Committee on Publication.

MR. SAYRE: I would like to ask for information. The Secretary stated that he had a more or less incomplete library, and that it should be continued or discontinued at the option of the Association, and one thing in consideration was the matter of storage. I would like to ask what the cost of storage is?

THE SECRETARY: I will say for the information of the Association that Professor Remington had occasion to send me fifty-six boxes of books and papers, and these have been unpacked and stored on the shelves. It was all we could store in the college. We have left now seventeen boxes of paper-bound copies of Proceedings which will have to be disposed of by the Association. A part of these could be placed on the shelves, if found to be more desirable than our incomplete volumes. At present I have the unbound volumes of our library on the shelves, and if it is the pleasure of the Association to authorize me to destroy them, I will have room to put a part of these Proceedings there. We have a large lot of the Proceedings in Baltimore, and several hundred copies of them in Lancaster, Pa. Those seventeen boxes of unbound copies are at present standing in the hallway of our college. If stored in a storage warehouse, the expense may not amount to much; it may be only two dollars a month, but it will soon eat up what they are worth for old paper.

MR. LLOYD: In this direction I would like to say a word. There must be among these journals many that are valuable. They might not be to this Association, but they must be to others, and I for one would dislike to see these journals destroyed without their having been examined by somebody who is interested in selecting some of those publications. They are very difficult to obtain, and it would be a mistake, I believe, on the part of this Association, to destroy them without having them properly examined. Only those who are endeavoring to collect some of these old publications can appreciate the difficulty that we have in finding certain numbers of them, and I think every journal and every catalogue that comes to this Association, should be put into a box and should

be kept and stored for a time to come when they will be of great value to those who will follow us. The American Association for the Advancement of Science has been storing its proceedings and exchanges in the State of Massachusetts for many years. They have many boxes of those proceedings, and this year they will receive from a university of this country a proposition to take these publications and index and catalogue them and put them in a special department created by that university, and have them advertised in such a way that scholars and students of the whole country can get them by exchange on application at any time. And I think in this library there will be some that will be of value in the same way.

MR. SEABURY: We all know that for many years Professor Lloyd has been collecting a very valuable library. It seems to me that there is no better man in the Association to whom these books could be given than Professor Lloyd. I do not believe it is going to be of any practical value for the Association to keep these books. It may be a good thing if we can find somebody like Professor Lloyd, who will be interested enough to get these things into the right channel. Therefore, I move that the Secretary of this Association be instructed to send to Professor Lloyd all the books that he deems unnecessary to keep for the benefit of the Association, to be put in Professor Lloyd's library.

MR. REMINGTON: I very warmly second that motion. I had something to do with overhauling those books, and I want to correct a statement made by the Permanent Secretary. There are a number which were selected to be destroyed left in the store room of the Philadelphia College of Pharmacy. Those books have not been destroyed, and I had Professor Lloyd in my mind at the time. I know that with his antiquarian instincts he can go over those books and find some material there which is valuable, where many others could not. He will be very glad to have those old books, which are absolutely worthless to the Association as a body. I would be very glad to have a list made and tabulated and sent to Professor Lloyd, and let him have any that he wants. I would warmly second Mr. Seabury's motion, and think that the books will be put where they will do more good for the Association than anywhere else.

MR. LLOYD: Before this motion is acted upon, I wish to call your attention to the fact that this library to which Messrs. Seabury and Remington have referred, is one which my brother and myself have been building up with the object of finally giving it intact to some educational institution, and we shall be glad to have any work that may be of no value to any member of our Association elsewhere. Anything that is given to that library will not be given to an individual. I will say further, that the University of Cincinnati is the University that has applied for the Library of the Society for the Advancement of Science, which is now doing no good. They propose to build a wing to the University for the library. Referring to these old books, we have often had great difficulty in getting a single number to complete a series. I have offered as high as ten dollars for a single number of some books that may be in that set, and I would not like to see them destroyed without having gone over them. I thank you very kindly for your offer.

MRS. MINER: I wish to speak particularly about the reports of the State Associations. I know in Kansas of but two complete reports of our Proceedings. I for one should like to have the privilege of obtaining any proceedings of the Kansas Pharmaceutical Association that Professor Lloyd or the American Pharmaceutical Association may not desire. I presume this same thing might be said of all the State Associations, and I would like to request that wherever these books are placed, we may have the privilege of obtaining the numbers if desired.

MR. LLOYD: I will say in reply to our friend that all duplicates that are received by

us are put away and indexed, and are retained there as duplicates for just such purposes as this. We have many duplicates. Sometimes we find it necessary to purchase nearly a complete library, in order to get a few books which we desire, and in it are duplicates of many books that we already have, and I presume we can help this lady to the volumes that she desires.

THE SECRETARY: It may interest the Association to know that, as I said before, a large number of these volumes are very incomplete, and, I am sorry to say, some desirable ones. For instance, there are the "Journal of the Chemical Society," the "Pharmaceutical Journal of Great Britain," and similar works, very incomplete, unfortunately. I have a full list, and shall be very glad to place it at the disposal of Professor Lloyd to look over.

MR. SAYRE: I wish heartily to second this motion, and it was for this reason I brought out the question of storage. At least, I wished to remark that if the Association had to pay storage on these, that we could certainly find a place where they would not cost the Association anything. I appreciate what Professor Lloyd is doing, the help he has given me from his library in the past; he not only aided me with books he had, but actually made a translation for me of a number of pages. I think the motion is in the right direction, and I heartily second it.

The question being called for upon Mr. Seabury's motion, it was put by the President and unanimously carried.

MR. LLOYD: On behalf of the pharmacists of the future who will study this library, I thank you. (Applause.)

THE SECRETARY: Right in connection with this matter, I should like to bring up a motion that the various Colleges of Pharmacy and Schools of Pharmacy in connection with Universities, be given, upon their application, a set of our Proceedings, partly to enable them to have a complete set, but chiefly for the purpose of reducing our stock. (Applause). Any College or School of Pharmacy connected with a University should receive, upon application, a set of our Proceedings. We have a very large number of them, I think something like thirty-five hundred volumes.

Seconded.

MR. EBERT: Are those full sets?

THE SECRETARY: Yes, we can make them full sets. We have everything complete from 1851 to date, except 1856 and 1861.

MR. EBERT: I do not believe we are in a position to donate anything. Many of the Proceedings are valuable, and no doubt if institutions belonging to universities took an interest in completing their sets, they could be sold at a popular price. I think a great many of our colleges are private institutions, and they could afford to pay for them.

MR. ELIEL: On this question, and other questions that have come up this morning, it seems to me we are wasting a great deal of very valuable time on very trifling matters. The majority of us have come a great distance to listen to reports and to discuss the business for which we have come here, the scientific papers and other interests. Here this meeting was to have been opened at ten o'clock this morning, and now it is half-past eleven, and very little has been accomplished. Our time has simply been wasted in talk.

MR. HALLBERG: I would like to offer a substitute for the recommendation made by the Secretary, namely, that the Council issue a cut-rate list of prices on the old reports. I have been waiting for fifteen years to get the old reports of this Association. I am not able to pay the price that the Association asks, but I would be willing to pay a cut-rate price. I lack about ten or twelve volumes of the complete set, and I would like very much to have them, but I cannot afford to pay three or four dollars for each volume. Now, if we have all these volumes without any special value to the Association, why not give the members a chance to get them at a reasonably low price? I would suggest that the Council revise the list of prices on these old reports, and give us a chance to buy them. (Applause.)

THE SECRETARY: Such cut-rate prices have been already published.

MR. HALLBERG: I know, but they are not low enough. (Laughter.)

MR. WHELPLEY: I am sure that if I had had the floor I would have said just what my friend Professor Hallberg said, and I desire to express the same sentiment. The Secretary says that we want to reduce the stock, and for that purpose offers to give them to people with whom we are unacquainted, and who do not desire them and will never use them. Now, like Professor Hallberg's, my set is incomplete, and the cost to me to complete it is $23.90 at the present prices—I looked it up this morning. I had made up my mind this morning to pay the $23.90, but since the Secretary is anxious to get rid of the Proceedings, I believe the members of the Association who are working in the organization are the ones who should be given the first opportunity to complete their sets.

MR. EBERT: Why not sell them to members of the Association who are in good standing, at a nominal price, the price to be placed at about 25 cents a volume.

MR. REMINGTON: The gentleman is under a misapprehension. The Secretary ought to read the published rate. Professor Hallberg says it is not low enough for him, but there is a cut-rate now for these Proceedings of not more than one-fourth of their cost; members can get them now for one-fourth of their face value.

MR. ALEXANDER: I move that we refer the whole matter to the Publication Committee.

The previous question being called for, Mr. Whelpley said:

I think the Association is ready to vote on this, if they understand the motion before them as the mover and seconder intend it to be understood, and that is that the Council make a lower rate than they have already done, and we will leave it to the good sense of the Council how low a rate shall be made.

Carried.

The Report of the Treasurer was then read as follows:

REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, JULY 1, 1894, TO JULY 1, 1895.

RECEIPTS.

Cash on hand, July 1, 1894	$4,091 67
Received from the sale of 8 Certificates @ $5.00	40 00
Received from the sale of 10 Certificates @ $7.50	75 00
Received from the sale of Proceedings	33 00
Received from the sale of Badges	62 50
Received for Interest on Deposit in New England Trust Company, Boston	95 89

Received for Interest on Money Invested in Bonds (General Fund)		$150 00
Received for Return on Premium—Fire Insurance Policy		7 20
Received for Annual Fees, 1891	$5 00	
Received for Annual Fees, 1892	50 00	
Received for Annual Fees, 1893	165 00	
Received for Annual Fees, 1894	3,530 00	
Received for Annual Fees, 1895	2,060 00	
Received for Annual Fees, 1896	5 00	
		5,815 00
Received for Life Membership Fees, viz.:		
Henry S. Wellcome	$45 00	
Adolph W. Miller	30 00	
		75 00
Received from the sale of National Formulary		324 28
Received from Local Secretary of 1894 Meeting at Asheville		296 00
		$11,065 54

DISBURSEMENTS.

1894.				
August	13.	Check 436. S. A. D. Sheppard, second half year's salary as Treasurer, 1893 to 1894		$375 00
	13.	Check 437. George W. Kennedy, second half year's salary as Secretary of Council, 1893 to 1894	$25 00	
		Second half year's salary as Secretary of Committee on Membership, 1893 to 1894	75 00	
				100 00
	13.	Check 438. Joseph P. Remington, second half year's salary as Permanent Secretary, 1893 to 1894		375 00
September	4.	Check 439. W. N. Jennings, Committee on Transportation		3 75
	4.	Check 440. The Werner Publishing Company, Committee on Transportation		21 00
	4.	Check 441. C. A. Mayo, Committee on Transportation		8 34
	4.	Check 442. St. Louis Engraving Company, Badges		26 50
	4.	Check 443. H. M. Whelpley, Miscellaneous		1 80
	8.	Check 444. R. G. Eccles, Section on Education and Legislation		13 50
	8.	Check 445. C. R. Morgan, Services as Stenographer		75 00
October	13.	Check 446. Joseph P. Remington, Miscellaneous.	$47 28	
		Insurance	36 00	
		Traveling Expenses	60 75	
				144 03
	13.	Check 447. "Evening Chronicle," Committee on Membership		34 25
	13.	Check 448. J. B. Lippincott Company, Printing and Stationery		14 65
	13.	Check 449. J. B. Lippincott Company, Printing and Stationery		33 00
	13.	Check 450. John S. Bridges & Co., Printing and Stationery.		37 20
	13.	Check 451. Wickersham Printing Company, 1893 Proceedings		78 40

October	13.	Check 452. Wickersham Printing Company, 1893 Proceedings	$12 07	
		National Formulary	9 14	
				$21 21
	17.	Check 453. L. E. Sayre, Section on Scientific Papers		32 69
	19.	Check 454. Henry Kraemer, second half year's salary, 1893 to 1894, as Reporter on Progress of Pharmacy		375 00
	19.	Check 455. Randolph–Ken Printing Company, Section on Scientific Papers		3 50
	22.	Check 456. Charles E. Dohme, Committee on Finance		4 20
	24.	Check 457. Charles Caspari, Jr., and A. R. L. Dohme, jointly, First General Prize		75 00
	24.	Check 458. Henry Trimble and Josiah C. Peacock, jointly, Second General Prize		50 00
	24.	Check 459. S. A. D. Sheppard, Traveling Expenses		79 87
	24.	Check 460. C. W. Schneidereith & Sons, Section on Scientific Papers		6 50
	24.	Check 461. William Baumgarten, two Seal Presses		12 00
	24.	Check 462. John S. Moke, Miscellaneous		16 81
	24.	Check 463. C. R. Morgan, Services as Stenographer		88 00
	24.	Check 464. Barry, Beale & Co., Printing and Stationery		10 50
	30.	Check 465. Wickersham Printing Company, National Formulary		56 00
November	2.	Check 466. William S. Thompson, Miscellaneous		5 00
	2.	Check 467. The Friedenwald Company, Printing and Stationery		16 00
	2.	Check 468. American Photo-Engraving Company, Proceedings		11 24
	6.	Check 469. American Druggists' Publishing Co., 1893 Proceedings		1 75
	6.	Check 470. Wickersham Printing Company, Insurance		5 50
	20.	Check 471. Charles Caspari, Jr., National Formulary	$3 20	
		1893 Proceedings	4 47	
		Miscellaneous	31 27	
				38 94
December	10.	Check 472. F. W. Barry, Beale & Co., Printing and Stationery		24 75
	10.	Check 473. John S. Bridges & Co., 1893 Proceedings		8 50
	10.	Check 474. C. W. Schneidereith & Sons, Section on Scientific Papers		17 25
	15.	Check 475. German Fire Insurance Company, Insurance		15 00
	17.	Check 476. Wickersham Printing Company, Section on Scientific Papers		53 39
	20.	Check 477. E. M. Uzzell, Printing and Stationery		4 25
	22.	Check 478. Joseph P. Remington, Miscellaneous		61 38
1895.				
January	8.	Check 479. Evening Chronicle, Printing and Stationery		4 50
	8.	Check 480. C. W. Schneidereith & Sons, Section on Scientific Papers		13 50
	18.	Check 481. John S. Bridges & Co., Printing and Stationery.		28 00
	18.	Check 482. John S. Bridges & Co., Printing and Stationery.		3 00

January	31.	Check 483. Wickersham Printing Company, National Formulary		$16 60
February	6.	Check 484. Charles Caspari, Jr., National Formulary	$2 24	
		Proceedings	3 93	
		Miscellaneous	45 74	
				51 91
February	19.	Check 485. Cushing & Company, Journals for Reporter on Progress of Pharmacy		15 63
	27.	Check 486. Charles Caspari, Jr., First half year's salary as Permanent Secretary, 1894–1895		375 00
	27.	Check 487. American Surety Company, Premium on Treasurer's Bond		25 00
	27.	Check 488. S. A. D. Sheppard, First half year's salary as Treasurer, 1894 to 1895		375 00
March	6.	Check 489. Henry Kraemer, First half year's salary as Reporter on Progress of Pharmacy, 1894 to 1895		375 00
	6.	Check 490. George W. Kennedy, First half year's salary as Secretary of Council, 1894 to 1895	$25 00	
		First half year's salary as Secretary of Committee on Membership, 1894 to 1895	75 00	
				100 00
	29.	Check 491. C. W. Schneidereith & Sons, Section on Education and Legislation		15 00
	29.	Check 492. Wickersham Printing Company, Proceedings	$5 08	
		National Formulary	8 11	
				13 19
April	5.	Check 493. Wickersham Printing Company, National Formulary		21 00
	10.	Check 494. F. W. Barry, Beale & Co., Printing and Stationery		45 35
	22.	Check 495. Wickersham Printing Company, Proceedings		3158 86
May	2.	Check 496. C. J. Kelly, Committee on Transportation		25 50
	2.	Check 497. Charles M. Ford, Committee on Transportation.		28 90
	6.	Check 498. Wickersham Printing Company, Proceedings		426 52
	23.	Check 499. John Collins, 1893 Proceedings		4 75
June	12.	Check 500. Dr. George F. Payne, Committee on Status of Pharmacists in United States Army and Navy		18 95
	12.	Check 501. Wickersham Printing Company, National Formulary		14 00
	12.	Check 502. Wickersham Printing Company, National Formulary	$4 05	
		Proceedings	45 86	
				49 91
	21.	Check 503. S. A. D. Sheppard & Co., Miscellaneous		37 65
	29.	Check 504. Charles Caspari, Jr., National Formulary	$5 31	
		Proceedings	8 64	
		Miscellaneous	14 00	
				27 95

April	5.	Life Membership Fund	$45 00
May	16.	Life Membership Fund	30 00
		Total	$7,781 32

SUMMARY OF DISBURSEMENTS.

July 1st, 1894, to July 1, 1895.

Proceedings	$3,770 07
Stenographer	163 00
Journals for Reporter on Progress of Pharmacy	15 63
Salaries, Second Half of the Year 1893 to 1894	1,225 00
Salaries, First Half of the Year 1894 to 1895	1,225 00
Premium on Treasurer's Bond	25 00
Traveling Expenses	140 62
Section on Scientific Papers	126 83
Section on Legislation and Education	28 50
Committee on Transportation	87 49
Committee on Membership	34 25
Committee on Finance	4 20
Committee on Status of Pharmacists in United States Army and Navy	18 95
Printing and Stationery	221 20
Insurance	56 50
Seal Presses	12 00
Miscellaneous Expenses	260 93
Badges	26 50
General Prizes	125 00
Total amount paid out for current expenses	$7,566 67
Life Membership Fund	75 00
National Formulary	139 65
Total amount of Disbursements	$7,781 32
Cash on hand July 1, 1895	3,284 22
	$11,065 54

Of the cash in the Treasury, the sum of $1052.36 belongs to the account of the Committee of Arrangements, as per following statement:

ACCOUNT OF COMMITTEE OF ARRANGEMENTS.

1894.			
July	1.	Cash on hand	$735 73
October	15.	Received from Whitefoord G. Smith, Local Secretary, for annual meeting held at Asheville, N. C., September 3–8, 1894, check for two hundred dollars, the same being the first installment of the amount left after paying expenses of the entertainment of the Association while in Asheville.	200 00
1895.			
February	2.	Received from Whitefoord G. Smith, Local Secretary, for annual meeting held at Asheville, N. C., September 3–8, 1894, check for ninety-six dollars, the same being the amount of the second and final installment after paying the expenses of the Association while in Asheville	96 00
July	1.	Interest to date	20 63
			$1052 36

PROSPECTIVE ASSETS.

Not counting what is due from members whose names will probably be dropped from the roll at the next annual meeting, and also from members whose residence is unknown, there is now outstanding on the books of the Association:

Annual Dues for 1894	$1320 00
Annual Dues for 1895	4355 00
	$5675 00

Respectfully submitted,

S. A. D. SHEPPARD,
Treasurer.

Upon motion of Mr. Remington, the report of the Treasurer was received and referred to the Committee on Publication.

MR. FORD: The Treasurer emphasizes one item in the report that I think the management at Asheville should be congratulated upon; that is, that they had a surplus of $296.00 and paid that into the funds of the Association. It is customary and always has been—not according to the by-laws, but something equally as strong as a by-law—for the Association to deposit a certain sum of money, which is left to the Committee, to be used as an entertainment fund, and whatever is left from that to be paid into the funds of the Association. That is the custom that has prevailed, I believe, and the one that is in vogue at this meeting. At the Asheville meeting there were 280 people who were entertained by the Committee. 280 is the largest number that I saw when I took a memorandum just before the Local Secretary closed his books. And the entertainment which is given at this, as well as other meetings, always costs more than the sum paid by the members and visitors. The entertainment given at this meeting will cost a sum in excess of the $3.00 paid by the members at this meeting. A large number have come to this meeting because Denver is a place that more people would rather visit than many other places, and there are a large number of visitors who have come as guests of the members, and therefore, guests of ourselves. Inasmuch as the entertainment will cost a sum in excess of the amount that was paid in, I want to avert the odium that might be placed upon us. (Applause.) I do not know but what Mr. Scholtz may have several hundred dollars to pay into the funds of the Association; he certainly will pay to the Association all that is left over after the meeting has passed; but if the sum should be a little less than $296.00, I don't want any member of the Association or its officers to think that we have made bad use of the money, or have not done as well as people have done at other places. I thank you very much. (Applause.) I want to say that the number we have registered is about 425, and it will be nearly twice what it was last year, I think. (Applause.)

THE TREASURER: I am very glad Mr. Ford made the remarks he did. I am sorry I emphasized that item, as it might lead to a possible comparison, which was very far from my thoughts. I mentioned it for the sole reason that when the Treasurer receives an unexpected amount of money like that, it is a matter he can scarcely refrain from mentioning.

MR. HALLBERG: It would seem that the difference in altitude between Asheville and Denver is ample explanation of any deviation in this excess. (Laughter.)

Mr. Whelpley offered the following resolution:

Resolved, That the Permanent Secretary be instructed to request the pharmaceutical journals to publish the revised schedule of prices for volumes of the Proceedings.

Signed, H. M. WHELPLEY,
C. S. N. HALLBERG.

Seconded and unanimously adopted.

The following report of the Committee on Membership was read, and upon motion of Mr. Hallberg was received and referred.

REPORT OF THE COMMITTEE ON MEMBERSHIP.

To the Chairman and Members of the Council of the American Pharmaceutical Association:

Gentlemen: As Secretary of the Committee on Membership, in compliance with requirements of the Association, I herewith transmit my report for your action.

Immediately after adjournment of the forty-second annual meeting, held at Asheville, N. C., last year (1894), your Secretary gave prompt attention to the duties of his office by mailing the ordinary invitation to each gentleman, who was invited to complete his membership by signing a blank form which was mailed at the same time. One hundred and eighty (180) gentlemen were recommended for election in conformity with the By-Laws of our Association. Of this number one hundred and thirty-seven (137), about 76 per cent. of those proposed, have completed their membership, and are now on the roll as active members of our organization. The new members represent nearly all sections of our country, as they are credited to thirty (30) States, three (3) Territories, District of Columbia and Canada. Since the Proceedings for 1894 have been published, the following gentlemen whose names are not on the roll have become members: Henri Lanctot, Montreal, Canada, and John Y. MacRae, Raleigh, N. C.

The Treasurer, S. A. D. Sheppard, has furnished your Secretary with an alphabetical list of names of members who are liable to be dropped from the roll for non-payment of dues, being three or more years in arrears. This list contains the names of one hundred and nine (109) who will be removed from the roll of membership, unless the amount of arrears are paid by the time the next volume of Proceedings is issued.

As you will no doubt observe by this report, the honorary membership of our Association has dwindled down to fifteen (15), death having invaded the ranks in this column, from time to time, until the number has been reduced as indicated; and of the number still remaining, not one of them is from our own country—the last on this list was Mr. David B. Smith, of Philadelphia, who died in 1883.

Both the special Auxiliary Committee ordered by the Association and appointed by the President, and the regular Standing Committee on Membership, have been industriously at work during the past year securing desirable members. Whether the result of their labors will show a large increase in membership or not, I am not at this writing prepared to say, but judging from the number of applications received, and the number who have already sent their annual dues to your Secretary, the outlook is decidedly gratifying, especially when you take into consideration the depression in business all over the country.

This year I have made some changes in my report in that portion which shows the number of members in good standing, by isolating the life members from the active or contributing members, so that an ordinary member, who does not give close thought to these matters, can see at a glance the exact number who are paying annual dues, and approximately the amount of revenue received from this source; besides he can readily ascertain the total number of life members on the roll, which I propose hereafter to report in a separate column, and also in my total membership to include all, namely, the active or contributing, the life and honorary members.

Report of Membership.

Members in good standing at last report	1,524	
Members elected since last report, including delegates	137	
Total membership		1,661

Loss in Membership.

Life members transferred to another column	98	
By resignation	22	
Dropped from roll for various causes	87	
By death	19	
Total loss		226

Life Membership.

Members on the roll at this report	98

Honorary Membership.

Number on the roll at last report (corrected)	16
Loss by death	1
Number on the roll at this report	15

Total Membership.

Active or contributing members	1,435
Life members	98
Honorary members	15
Total	1,548

While the subjects of these reports are always sufficiently new and varied to make their annual preparation not an unpleasant task, yet there is one subject to which I am compelled to recur as often as the year comes around. I do not think there has been a single year, in my long connection with the Committee on Membership of twenty-one years, in which ten or more of our members have not been called to their long home. The past year has been no exception, as the twenty names which I shall report will prove. Truly, the reaper Death is no respecter of persons, and as the unexpected has occurred to others, it is equally certain that it will occur to some of us during the coming year. May the call find us ready.

The names of those who have died since my last report, are as follows:

Henry E. Ahlbrandt, St. Louis, Mo.
Henry J. Alfreds, Providence, R. I.
John I. Bell, Chicago, Ill.
Edmund Bocking, Wheeling, West Va.
William Bush, Worcester, Mass.
Samuel M. Colcord, Dover, Mass.
John A. Dadd, Milwaukee, Wis.
Charles W. Drake, Middleboro, Mass.
Frederick A. Flückiger, Berne, Switzerland.
Charles F. Goodman, Omaha, Neb.
Edward C. Jones, Philadelphia, Pa.
John Jones, Jr., Gold Hill, Nev.
August Knoefel, New Albany, Ind.
Louis Lauranson, Memphis, Tenn.
Henry Maclagan, New York, N. Y.
Frederick F. Prentice, Janesville, Wis.
Henry Ryan, Taftsville, Conn.
Theodore Schumann, Atlanta, Ga.
William S. Thompson, Baltimore, Md.
Frederick T. Whiting, Great Barrington, Mass.

Dr. Henry E. Ahlbrandt, of St. Louis, Mo., died at his home July 23d, 1895, aged 45 years. Deceased was an educated pharmacist, and conducted a pharmacy in St. Louis

for 26 years, where he did a prosperous business, and was respected by all who knew him. He was a life member of the St. Louis College of Pharmacy, and a member of the Missouri State Pharmaceutical Association. Deceased became a member of our Association in 1877, at the meeting held in Toronto, Canada.

Henry J. Alfreds died at his residence, Adelaide Avenue, Providence, R. I., December 9th, 1894. He was born in Haverstraw, N. Y., in 1852. Leaving there with his parents at an early age, he went to Providence, where his father was employed in the Cranton Point Works. At the age of 12 or 14 he secured employment in the same place, and continued there until he met with an accident, which necessitated his seeking some other employment. He secured a position with Chambers, Calder & Co., wholesale druggists, of Providence. He continued with this concern until about fifteen years ago, at which time he entered the retail drug business on his own account, and during these years he has owned several stores, all of which, with the exception of the store located on Eddy street, had been disposed of at the time of his death. He had been in poor health for a long time, and a great sufferer, but his condition was not considered either serious or necessarily fatal until recently. But his trouble proved to have been Bright's disease, and after a period of great suffering he finally succumbed to that incurable complaint. His interest and ability made him one who was admired and appreciated for his disposition and inclination to devote to the advancement and general welfare of his fellow druggists all the energy which his active business life would permit. This inclination, coupled with a most genial disposition, made him an efficient man in every channel in which he interested himself. He was the first Vice President of the Rhode Island Pharmaceutical Association, and a prominent and active worker on a large number of important committees of the Association. He was Vice President of the Mortar and Pestle Club, and an active, successful worker to the ends for which the club was organized. His death removes from among the druggists of Rhode Island a man of sterling ability, who was progressive in his professional life, and possessed of unusually genial and companionable qualities to endear him to his social acquaintances and intimates. Mr. Alfreds was elected a member of our Association in 1872, at Cleveland, Ohio.

John I. Bell, of Chicago, was born in London, England, January 19, 1846. He began the study of pharmacy with Dr. Snape in his native city, where he remained as an apprentice for seven years. He came to this country in the fall of 1868, and made Chicago his home. He was employed by Mr. A. E. Ebert, at Twelfth and State streets. From there he went to Evanston, Ill., in the employ of Mr. John Goebel; remained with him until 1874, and subsequently started a store for himself in the same town, which he conducted until the spring of 1880. He then returned to Chicago and bought the store of L. C. Hogan, north-east corner Forty-seventh and State streets. In 1884, he moved to the south-west corner, and remained there up to date of his death, which occurred June 5, 1895. In 1876 he was married to Jennie E. Crapser, who, being a graduate of the Chicago College of Pharmacy, aided him in his business. She will continue the business at the old stand. Mr. Bell had the reputation among the craft of being a man of ability as a pharmacist, and this was shared by the general public who knew him. Deceased joined our Association at the meeting held at Old Point Comfort, Virginia, in 1890.

Edmund Bocking, a well-known citizen and veteran business man of Wheeling, West Virginia, died at his home, July 31, 1895, from a complication of diseases, which the best medical skill could not successfully battle. Mr. Bocking was born in Dusseldorf, Prussia, in April, 1834, his parents being Adolph and Mary Bocking. They emigrated to America in 1849, settling at Phillipsburg, Beaver county, Pennsylvania. Early in life young Bocking showed an aptitude for the drug business, and found his first employment in 1850, in a Pittsburg drug store. In 1851, he removed to Wheeling, and continued to prosecute the study of pharmacy, and in 1856 he opened a drug store of his own, where

he remained continuously up to his end. Few pharmacists were as thoroughly acquainted with the business in all its details, and deceased soon won a general reputation as a careful apothecary. He always took an active interest in his vocation. He was one of the promoters and organizers of the West Virginia State Pharmaceutical Association. He was one of the framers of the West Virginia pharmacy law, and held the position of Commissioner of Pharmacy for West Virginia for four years. He held the position of County Commissioner for one term. Deceased was married in 1856 to Sarah, daughter of George W. Johnson, one of Wheeling's best known business men. Mrs. Bocking died many years ago. In 1893, Mr. Bocking married Miss Wilson, a sister of Dr. L. W. Wilson, an eminent physician of Wheeling. Deceased had several children, but all are dead. Mr. Bocking served on several committees in our Association, and contributed several papers and reports. He became a member of our organization in Louisville, Kentucky, in 1874.

William Bush, of Worcester, Mass., died October 10th, 1894, at his home, after a short illness. Mr. Bush was born eighty-two years ago in Dudley, Mass. He was postmaster in Spencer, Mass., under President Polk's administration, from 1845 to 1849. He established himself in the drug business in Worcester in the year 1852, and continued until 1893. He conducted the business all alone until 1887, when he formed a partnership, which was continued until 1893, when he sold his interest to his partner and retired from business. The business is still conducted under the old firm name of Bush & Co., at the old stand on Front street. Mr. Bush was married October 15th, 1840, to Miss Laura Rice, of Brookfield, Mass., who survives him with two daughters. Mr. Bush became a member of our Association in 1875, at the meeting held in Boston, Mass.

Samuel Marshall Colcord was born May 8, 1817, in the town of Somersworth, N. H. Very early in life he removed to South Berwick, Me., in the schools of which town he received his education, studying the higher branches at Berwick Academy. At the age of 17, young Colcord entered the drug store of David Kimball, of Portsmouth, N. H., and served his full time as an apprentice in accordance with the custom in those days. David Kimball was a fine representative of the thoroughly trained old school druggist and apothecary, a man of great intelligence, sterling character, and charming personality. To have been trained by David Kimball was all the endorsement needed by a young man to secure employment on the completion of his apprenticeship. In 1837, Mr. Colcord was employed in New York during the terrible business depression and panic of that time. While there he attended the lectures given in the College of Pharmacy of the city of New York. Being in poor health he next went South, and remained in New Orleans for some time, gaining an insight into the methods of conducting the wholesale drug business in that market. On his return from New Orleans he went into business, about 1843, and later on was a member of the well-known firm of Carter, Colcord & Preston. This firm continued until 1862, when it was dissolved by reason of the death of Mr. Preston, and the retirement of Mr. Carter. The firm of S. M. Colcord & Co. succeeded to the business at the old stand. In 1864 Mr. Colcord retired from the firm, and was succeeded by Burleigh & Rogers. The same year he entered the firm of Theodore Metcalf & Co., 39 Tremont street, Boston, taking the place of Mr. W. W. Goodwin, whose interest he bought. In 1877 Mr. Colcord retired from the firm and from the drug business. In October of the same year he removed with his family to a farm of 100 acres in Dover, Mass., and from that time until his death devoted his attention to agricultural pursuits.

He was a man who took the utmost interest in all affairs that concerned the welfare of his fellow men. He was an able, fearless, honest and resolute advocate of every movement that promised public or professional advancement. Mr. Colcord joined the Massachusetts College of Pharmacy in 1851, and in 1852 was elected a member of the Board of Trustees, upon which he served until his retirement in 1877, most of the time as its chairman. In 1853 he was elected Second Vice President, and in 1854 First Vice Presi-

dent, serving in that office until 1860, when he was chosen Auditor, in which capacity he remained until again made Second Vice-President, in 1863. This office he held until his election as President, in 1871, which office he retained until 1887. Mr. Colcord took a deep interest in the welfare of the Massachusetts College of Pharmacy, and was especially earnest in the work of starting and maintaining a school of pharmacy under the authority of the College. On the 18th day of October, 1851, there assembled in a room of the College of Pharmacy of the city of New York the first convention of pharmacists and druggists ever held in the United States. This convention met for the purpose of establishing a standard of purity and equality in imported drugs and medicines, and to dicuss subjects relating to the general advancement of the standard of pharmaceutical education throughout the land. This meeting was attended by the following delegates: From the Massachusetts College of Pharmacy, Dr. Samuel R. Philbrick, Thos. Restieaux and Samuel M. Colcord; from the College of Pharmacy of the City of New York, George D. Coggeshall, Dr. C. B. Guthrie, and Thos. B. Merrick; from the Philadelphia College of Pharmacy, Charles Ellis, Prof. Wm. Proctor, Jr., and Alfred B. Taylor. In this Convention the Boston delegates took an active part, especially Mr. Colcord. The outcome of this Convention was that it put itself squarely upon record as being in favor of high standards of purity and quality in drugs and medicines, and strongly expressed the opinion that the time had arrived for the formation of a National Pharmaceutical Association, having for its aim the improvement of the practice of pharmacy, the regulation of the systems of apprenticeship, the encouragement of pharmaceutical research, and the advancement and extension of organized systems of pharmaceutical education. The convention finally determined to issue a call for a meeting to take place in Philadelphia, in the hall of the Philadelphia College of Pharmacy, October 6th, 1852. Thus were the first steps taken in the formation of the American Pharmaceutical Association. At this meeting Mr. Colcord was elected Second Vice President. He was Treasurer from 1854 to 1859, and was elected President in 1859–60. During the first twenty-seven years of the history of our Association he was seldom absent from the annual meetings. Mr. Colcord was a member of the National Convention for the Revision of the United States Pharmacopœia of 1860 and 1870. Mr. Colcord died at his home in Dover, Mass., March 5th, 1895. He was twice married, and leaves a wife and four children. In the death of Mr. Colcord pharmacy has lost one of its most earnest workers, the country a good citizen, his business and social associates a steadfast friend, and his family a most excellent husband and a wise and indulgent father.

John Alfred Dadd, one of Milwaukee's oldest residents and one of the most progressive and energetic pharmacists in the West, died at his residence, 1212 State Street, of congestion of the brain. There are few among the old residents of Milwaukee who were more popular than the deceased. He was a very active member of the Old Settlers' Club, and at the annual banquet held February 22d last, he delivered an address on "The Progress and Development of Milwaukee," which was remarkable for the great work in collecting facts manifested in it and the clear and concise style followed. He also delivered the address to the graduating class of the Department of Pharmacy of the University of Wisconsin. He was, perhaps, the most active man in Wisconsin in the advancement of pharmacy—and through his energy in the interest of the science, and his great familiarity with it, he achieved quite a reputation. Deceased was born in Chatham, Kent County, England, on May 24, 1829. At the age of sixteen, he was apprenticed to a pharmacist in London, Eng., and he remained as an apprentice until he was twenty-one, when he came to America, and direct to Milwaukee, where he entered the pharmacy of Mr. Harrington, on Wisconsin Street, remaining with him until 1872, when he went into business for himself at 221 Grand Avenue; this stand he has maintained ever since, of late years, together with his son Robert, who will continue the business. October 4th, 1856, he was married to Miss Mary Morrow, and she and her son

Robert, born thirty-seven years ago, are the only near relatives in America to survive him. His activity in pharmacy dates from the time he first came to Milwaukee from England; through his efforts the Wisconsin State Pharmaceutical Association was organized in 1880, of which organization he was elected the first President; and in 1882 he was an earnest advocate for having the pharmacy law passed by the legislature. When the old City Board of Pharmacy was established, in 1876, deceased was the first man appointed by the Mayor. He rendered excellent service, and he was continued as a member until the many other duties which he performed in the advancement of his profession, which found in him such an able follower, made it necessary for him to retire. His ability and knowledge were fully appreciated in the city of Milwaukee. When the graduating examining board of the department of pharmacy was established at the University of Wisconsin under Prof. Power, now in New York, deceased was appointed a member, and he remained on the Board until his death. It was by his efforts in behalf of the department that it has succeeded in advancing so rapidly. In 1884, Mr. Dadd was elected First Vice-President of our Association, and his membership with us dates back from the meeting held in Saratoga Springs, N. Y., in 1880.

Charles W. Drake, of Middleboro, Mass., died at his residence on September 16th, 1894, aged forty-five years. He was a native of the town where he conducted business, receiving his education in the public schools and Pierce Academy. He studied the drug business in Middleboro, and after serving several years as an apprentice, went into business for himself. In this undertaking he was quite successful; he paid close attention to business, and had the reputation of being a conscientious and fair-dealing man in all his business transactions. He held quite a number of positions of honor and trust in Middleboro, and was the Chief Engineer of the Fire Department. He leaves a widow, son and daughter, to mourn their loss. In 1873, deceased was elected a member of our Association, at the meeting held in Richmond, Va.

Frederick August Flückiger, an honorary member of our Association, died at his home in Berne, Switzerland, December 11th, 1894. Dr. Flückiger was born May 15th, 1828, at Zaugelthal, and was thus in the sixty-seventh year of his age. The foundation for his future greatness was laid in the elementary schools, in which he took a thorough course, after which he began to devote himself to the study of pharmacy. At the completion of his apprenticeship he continued in his chosen profession at Burgdorf. To his pharmacy he lent his individuality to such an extent that its reputation was not confined to its city, but spread until it was known far from home. The druggists, chemists and physicians, in the country round about, made use of this store as their rendezvous. In 1860, Dr. Flückiger was elected State Pharmacist of Berne, and soon became a conspicuous figure of the University, becoming in 1871 an adjunct professor in that institution. Two years later he received an appointment to a professorship in the King William University at Strassburg, where he also became Director of the Pharmaceutical Institute and President of the Examining Commission. He withdrew from Strassburg about three years ago and retired to private life in his native Switzerland.

Dr. Flückiger was well known not alone as a teacher, but his contributions to pharmaceutical literature have given him an even wider reputation. He is best known to the pharmacists of America, for whom, by the way, he is said to have had a very friendly feeling, as one of the authors of the Pharmacographia, which he produced conjointly with his distinguished English brother, Daniel Hanbury. This work shows the patience, hard work and thoroughness, which were characteristic of the man. This, however, is by no means the extent of his labors in this line, he being the author of several other books, some of which have been translated into English, and of many valuable contributions to foreign pharmaceutical periodicals. Before leaving Switzerland for Strassburg, he was for many years the chief officer of the National Apothecaries' Association there. Deceased was elected an honorary member of our Association in 1868, at the meeting held in Philadelphia, Pa.

Charles F. Goodman, died of Bright's disease, on Friday morning, January 11th, 1895, in his sixty-first year, at his residence, South Tenth St., Omaha, Neb. He was born in Saxony, Germany, in 1834, and when fifteen years of age entered a Saxon University of Chemistry, taking a three years' course, after which he came to America and soon found employment in the drug business at Columbus, Ohio. After a time he engaged in business for himself in Petrolia, Pennsylvania, which was then just coming into prominence as a great oil field. In 1868, believing that the West was offering greater inducements for the rapid accumulation of wealth, he went to Omaha and started a first-class pharmaceutical establishment. By his progressive nature and financial ability, he soon became possessed of a profitable business. Finally, it became so extended that it was impossible to accommodate it in the building then occupied. A larger building was, therefore, secured, and the wholesale department removed to it. He finally decided, however, to leave the jobbing business, and sold out to the Richardson Drug Company, eight years ago, carrying at that time by far the largest stock west of Chicago, and his business extending over the entire western country tributary to Omaha. Mr. Goodman always took an active interest in local affairs, and represented Douglas County in the State Legislature for several years; was a member of the City Council, President of the Board of Education, and President of the Board of Trade. He was one of the first to join the Nebraska State Pharmaceutical Association when it was organized, and always took an active part in its meetings. He was First Vice-President the year of 1883–'84, and President of the Association during the year 1889–'90. He was the oldest member of our Association from Nebraska, and was elected in 1884 as Third Vice-President, and also served one term of three years in the Council. His sons will carry on the business as before. Deceased became a member of the Association in 1871, at the meeting held in St. Louis, Mo.

Edward C. Jones, son of William and Jane P. Jones, was born August 26, 1843, in Philadelphia. His parents were strict members of the Society of Friends, and he, being of delicate health in boyhood, was first sent to the Friends' Select School of Philadelphia to receive his education, and later to the Westtown School, Chester county, Pa. On September 6, 1860, he went to learn the "drug and apothecary business" with Amos H. Yarnall, at the southeast corner of Fifteenth and Market streets, remaining four years. During his apprenticeship he attended the Philadelphia College of Pharmacy, and graduated in March, 1864, ranking second in his class. The subject of his thesis was "Leptandra Virginica." After graduation he went to Chicago, and spent a short time in the laboratory of E. H. Sargeant, and later was in the employ of W. J. M. Gordon, of Cincinnati. His health failing, he returned to his native city, and went into business with his former preceptor, in the store in which he had served his apprenticeship. In 1877 Mr. Yarnall died, and Mr. Jones succeeded him as the head of the firm of Jones & Shaw, which became later E. C. Jones & Co. In 1889 the firm was dissolved, and soon afterwards Mr. Jones associated himself with the firm of Robert Shoemaker & Co., of Philadelphia, with which he remained up to the time of his death.

In 1864 the Alumni Association of the Philadelphia College of Pharmacy was founded, with Edward C. Jones as its leading spirit. In 1868 he was made Treasurer of the Association, and not only filled that position with remarkable fidelity up to the time of his decease, a period of twenty-seven years, but took a most active part in the general work of the Association. So self-sacrificing were his labors that the Alumni Association founded, in connection with its twenty-fifth anniversary, the "Edward C. Jones Scholarship," entitling the student receiving it to the privilege of working in the chemical and pharmaceutical laboratories of the Philadelphia College of Pharmacy during the college term. In 1866 he was elected a member of the Philadelphia College of Pharmacy. In 1874 he was elected to its Board of Trustees, to fill an unexpired term, and was elected for a full term on September 28, 1874, since which time he has been continuously a

member of that body. He was a faithful and zealous worker for every measure to advance the interest of the College, and the College owes much of its eminent success to his never-ceasing labors in its behalf. He was a member of the Pennsylvania Pharmaceutical Association, the Philadelphia Drug Exchange, and the Trade Association of Philadelphia Druggists, in all of which organizations he took a lively interest. His recent demise came as a keen shock to his many friends; the day before he died he saw a number of them, and appeared to be in the best of health and spirits. Special meetings of the Board of Trustees of the Philadelphia College of Pharmacy and of the Executive Board of the Alumni Association were at once called, feeling remarks were made, and appropriate action taken. A large delegation of pharmacists from Philadelphia and vicinity attended the funeral services. Interment was made at the Middleton Friends' Burial Ground. Deceased was elected a member of our Association in 1864, at the meeting held in Cincinnati, Ohio.

John Jones, Jr., of Gold Hill, Nevada, died at his home after a short illness. Deceased not only had a reputation at home of being a skilled pharmacist, but was known throughout the State as such; he was very particular as to the class of medicines he dispensed, using only the best that could be obtained. He took considerable interest in raising the standard of pharmacy. Mr. Jones became a member of our Association at the meeting held in San Francisco, Cal., in 1889.

August F. Knoefel, an old and highly respected citizen of New Albany, Ind., died December 7th, 1894, at his summer residence, Orolo Heights, after an illness of two weeks, of pneumonia. Several months before his death he sustained a paralytic stroke, and since then he has been in failing health. Deceased was born in 1824, in Niedergrauschwitz, Saxony, Germany. After receiving a pharmaceutical education in his native country, in 1848, at the age of twenty-four, he came to this country with his young wife. Arriving in New York City, he immediately went to Pittsburg, where he remained but a short time; he then went to Louisville, Ky., where for several years he was employed in the City Hospital as Assistant Surgeon. In 1858, he removed to New Albany, Ind., where he went into business for himself on Market Street, at which location he conducted business up to the time of his death. Deceased was a very successful business man, which was due to the close attention given in compounding and dispensing prescriptions; he was exceedingly careful as to the quality of drugs he purchased and sold, handling only the best obtainable. Mr. Knoefel was a conscientious, honorable, and estimable citizen, and enjoyed the highest respect of all. He leaves a wife and six children to mourn his loss. Mr. Knoefel's two daughters, Mrs. E. C. Rockenbauch and Miss Minnie, will continue to carry on the business for their mother; both are graduates in pharmacy. Mr. Knoefel became a member of our Association in 1879, at the meeting held in Indianapolis, Ind.

Louis Lauranson, of Memphis, Tenn., died October 7, 1894. Mr. Lauranson was born in France forty-one years ago, but had been engaged in the drug business at Memphis for a number of years, and had also been connected with the laboratory of a manufacturing firm in Kentucky. Owing to his close attention to business, at the time of his death he had established an excellent and profitable trade. Mr. Lauranson was a member of the Tennessee Board of Pharmacy. His term would have expired in April, 1895, and he had been recommended for re-appointment. He was Treasurer of the Tennessee Druggists' Association. Deceased was a man well versed in his profession, retiring in his habits, and commanded the respect of all who knew him for the honest and straightforward course which he pursued. Mr. Lauranson became a member of our Association at the meeting held in Asheville, North Carolina, last year (1894.)

Henry Maclagan, head of the Pharmaceutical Laboratory of McKesson & Robbins, died suddenly on August 3, 1894. Mr. Maclagan was forty-five years old. He was born in Brooklyn, N. Y., but spent the early years of his life in Canada. Returning to his

native city, he became an assistant in the pharmacy of W. H. Safford, and for the last fifteen years had been with McKesson & Robbins, of New York city. Deceased was considered one of the best chemists in this country. He was one of the first chemists to manufacture muriate of cocaine in the United States, and discovered a very useful test for the quality of this now important chemical. Mr. Maclagan was of a very modest and retiring disposition, and was held high by the firm with whom he was connected, both as a gentleman and a scholar. In 1883, Mr. Maclagan was elected a member of our Association at the meeting held in Washington, D. C.

Frederick F. Prentice, of Janesville, Wisconsin, died there of a complication of diseases. Mr. Prentice was born in one of the Western States, and after receiving a good common school education, began the study of pharmacy, of which he was very fond. He served a regular apprenticeship to the drug business, and for some time conducted a pharmacy in Kenosha, afterwards in Janesville, where he remained until he died. Mr. Prentice was considered an excellent pharmacist, and much respected and honored in the place where he did business. He took an active interest in the profession of his choice, and devoted considerable of his time to elevate its standard. Deceased was elected a member of our Association in 1876, at the meeting held in the city of Philadelphia.

Henry Ryan, of Taftsville, Conn., died at his home after a brief illness. Mr. Ryan conducted the drug business in Taftsville for a number of years, having served a regular apprenticeship at the business prior to going into business for himself. He had the reputation of being a very careful and conscientious pharmacist, and was much respected by the citizens in the town where he did business. In a quiet way he did considerable towards elevating the pharmaceutical profession. Deceased became a member of our Association in 1892, at the meeting held at the Profile House, N. H.

Dr. Theodore F. Schumann, of Atlanta, Ga., died December 30th, 1894, aged seventy-one years. Some affection of the heart was the cause of his death, which was quite unexpected. Dr. Schumann had been engaged in the drug business at Atlanta for about twenty-five years, and was one of the best known and most popular citizens of the place. His store was at the corner of Whitall and Hunter streets. About two years ago he retired from business. During his long residence in Atlanta, Dr. Schumann formed the intimate acquaintance and friendship of a large number of the best people of the place, and he had been identified with many movements for the good of the city and State. He was a public-spirited citizen, and gave freely to objects of charity and benevolence, having a sympathy for the unfortunate, which was one of his cardinal virtues. Recently, he became interested in the movement to establish a reformatory for juvenile criminals, and was one of the leading advocates of that measure of reform. His benevolence was always of a quite unassuming nature, he being averse to display. He was at all times modest and retiring, and when not at his place of business, passed the time in study and reading at his home. He was exceedingly fond of his books, and his library was his favorite place. Dr. Schumann was one of the most thoroughly educated men in Atlanta, and while he was unable to speak English fluently, his conversation showed the result of profound thought and study. He was a native of Germany, having been born at Wurtemberg, November 26th, 1823. He was schooled in his native city, and at the age of seventeen was given a diploma of graduation as a chemist, his talent for medicine being inherited. His course was finished at the University of Tubingen, Germany, in 1840, and soon afterward he first entered the profession which he followed for a lifetime; for fourteen years after his graduation he resided in different cities in Germany, and in 1854 emigrated to the United States, locating at New York, where he remained fifteen years, going to Atlanta in 1869. He served as Chairman of the Georgia Board of Pharmacy three years, and was President of the Georgia Pharmaceutical Association two terms. He was one of the founders of the latter. Deceased became a member of our Association in 1860, at the meeting held in the City of New York.

William Silver Thompson, of the firm of Andrews & Thompson, Baltimore, died November 2d, 1894, at his home in Waverly, aged 72 years. He was born in Delaware, and at an early age, losing his parents, he removed to Baltimore, and at the age of 17 entered the well-known and long-established pharmacy of the late Geo. W. Andrews, with whom, as an apprentice, clerk and partner under the firm name of Andrews & Thompson, he remained until the retirement of Mr. Andrews, after which the business was continued by Mr. Thompson under the old firm name until the day of his death. Mr. Thompson graduated in the first class of the Maryland College of Pharmacy, along with A. P. Sharp, of Sharp & Dohme, in 1842, and to his death remained connected with the college, being at one time its honored president. During the publication of the Journal of the Maryland College of Pharmacy, he acted as its editor, and took an active part in the progress of the college and of all branches of science connected with pharmacy. Mr. Thompson was perhaps the oldest apothecary in Baltimore, both in years and length of service, having been in the business for fifty-six years. He was an enthusiastic pharmacist, and a leader in his chosen profession. He was a member of the Maryland Academy of Sciences, and the Maryland Historical Society. He was highly esteemed on account of the probity of his character, and the promptness and modesty which characterized his dealings with his fellows. A widow and three children survive him. He was one of the oldest members of our Association, having connected himself with it in 1856, at the meeting held in Baltimore, Md. In 1860 he was elected second Vice-President of our organization.

Frederick T. Whiting, of Great Barrington, Mass., died at his home March 29th, 1895. Seven years ago, while attending a meeting of the Massachusetts Pharmaceutical Association, in Boston, Mr. Whiting suffered a shock of paralysis, from which he never fully recovered. He returned to his home, and although regaining his health to some extent, he was forced to abandon that active interest in his business, which had been so marked a characteristic of his long and useful career. For the past five years his visits to his store had gradually grown less frequent, and since the death of his wife, which occurred in April, 1894, he spent most of his time at home, leaving his business exclusively in charge of his partner and sons. Mr. Whiting was born in West Stockbridge, Mass., June, 1825. There he received what education the public schools could afford. Although reared in humble walks of life, he early manifested a disposition to create a career for himself that would lift him to a higher plane of usefulness and duty. When quite a young man he went to Great Barrington, and began the study of pharmacy. After serving an apprenticeship at the drug business, he concluded to branch out for himself. He had saved $50, and this with a like sum, borrowed from a friend, was the capital with which he began the drug business. He went to New York and judiciously invested his little sum in drugs, which, upon his return, he offered for sale in a small building which stood on the site of the present Sumner building. He was about 21 years old when he thus started in business, and it is recorded of him that he gave the most devoted attention to the development and growth of his establishment. He remained in this location, constantly increasing and enlarging his stock, until the demands of his business required larger and more appropriate quarters. This resulted in his purchasing a lot on Main street, almost opposite his old stand, and erecting thereon the three-story brick and brown-stone store in 1867, where the firm has since conducted its business. In 1880 he took into partnership with him his son John F. Whiting, and the firm name became F. T. Whiting & Son. The enterprise of this firm was never allowed to flag, and it has done for many years probably the largest jobbing and retail drug business in Berkshire county, if not in Western Massachusetts. They always made it a rule, though located in a small village, to keep a stock on hand of any article in their line that it was not supposed could be had outside of the large cities. In 1849 Mr. Whiting married Miss Ruth M. Hill, and four children were born to them, a daughter dying in in-

fancy, J. Fred., Henry M., and Mrs. Freeman, of Glen Ridge, N. J. At home he always declined to hold office, although frequently solicited to do so, but in 1871 he was elected a member of the House of Representatives. Deceased was one of the original stockholders in the Great Barrington Water Company, and held the treasurership for many years. He also held the treasurership of the Mahaine Cemetery Association, and for a time was a director of the National Mahaine Bank. In 1878 he was elected first Vice-President of our Association, having become a member of our organization in 1863, at the meeting held in the city of Baltimore, Md.

In concluding this, my twenty-first annual report, I desire to express my thanks to all officers and members of the Association who so promptly responded when their assistance was required. I desire, also, to call the attention of all members to the importance of notifying the Secretary when they hear of the demise of a member, and, if possible, to send him such data as they can conveniently obtain, so that he can prepare an obituary, and at the same time keep the records in regard to membership correct.

Very respectfully,

GEO. W. KENNEDY,
Secretary Committee on Membership.

The Committee on the Ebert Prize made the following report, which, upon motion of Mr. Kennedy, was received and referred to the Publication Committee:

REPORT OF COMMITTEE ON THE EBERT PRIZE.

The undersigned Committee on the Ebert Prize, appointed by the Chairman of the Section on Scientific Papers, has the honor of submitting the following report:

By the founder's direction, this prize is to be awarded for the best essay or written contribution (if deemed worthy of a prize at all) containing "*an original investigation of a medicinal substance*," determining new properties, or containing other meritorious contributions to knowledge; or for "*improved methods*" of determined merit "*for the preparation of chemical or pharmacal products;*" the prize to be awarded within six months of the annual meeting at which the paper was presented.

In view of the emphasis laid upon the words in quotation marks, and printed in italics, as well as the interpunction employed (compare Proceedings for 1894, Vol. 42, p. 16), your Committee is of the opinion that any paper not strictly complying with the prescribed conditions is not eligible for the prize, no matter how excellent it may be in other respects. Therefore, since none of the papers of merit presented at the last meeting have as subject a "medicinal substance," or give "improved methods for the preparation of chemical or pharmacal products," your Committee decides that none of them is entitled to the prize.

Respectfully submitted,

CHARLES RICE,
CHAS. O. CURTMAN,
WILLIAM C. ALPERS,
Committee on the Ebert Prize.

REVISION OF THE UNITED STATES PHARMACOPŒIA.

The Committee on Revision of the United States Pharmacopœia submitted the following report:

Mr. President and Members: Your Committee on Revision of the United States Pharmacopœia desire to report as follows:

That they heartily endorse the report of the Committee made in 1894 at the Asheville meeting, especially the portion relating to the introduction of maximum doses in the

Pharmacopœia. In view of the fact that the Pharmacopœia is used to some extent in foreign countries, and that many of our physicians have bought it, it would seem as though the total reported sale up to December 31, 1894, of 13,944 copies, was rather small. When we take into consideration that there are nearly 40,000 drug shops in the United States, this showing is small, as, on a fair estimate, less than 25 per cent. will be found in possession of a copy. We therefore recommend, in order to make the Pharmacopœia more popular with all classes of pharmacists, that popular and widely-used preparations, such as Comp'd Syrup of Stillingia, be made official by insertion of working formulas for the same.

We recommend that granulated opium be used in the preparation of tincture of opium and the tincture of deodorized opium, and that the use of precipitated phosphate of calcium be omitted in their preparation.

We recommend that such of the medicated waters as are now directed to be made by trituration with precipitated phosphate of calcium, be made either by agitation of the oils with hot water and subsequent filtration, or by use of a double filter, the inner one a size smaller than the outer, and evenly saturated with the oil, and the outer one wetted.

We recommend experiments with dextrine syrup of glucose in the place of glycerin, in the preparation of fluid extracts containing resinous matter.

We also recommend experiments with acetic acid in the manufacture of fluid extracts and tinctures, to replace in part, at least, the alcohol now directed to be used.

Soap Liniment.—Numerous complaints have been made that the liniment becomes solid at the ordinary temperature of the room. This should be investigated. Either the castile soap used is not pure, or the quantity directed by the Pharmacopœia is too great.

Aloin.—The test should be modified to include the melting point, and the solubility should be changed.

Potassium Ferricyanide.—Pages 477-520, the chemical formula should be $K_6Fe_2(CN)_{12}$ instead of $K_6Fe(CN)_{12}$.

Sodium Hypophosphite.—Page 360, second line, second paragraph, should read mercuric chloride instead of ammonium chloride.

Acetanilid.—Under tests. The term isonitril means nothing, and should be superseded by phenilisocyanide.

Termination "ol" should be limited to phenols and alcohols, and should not be applied to aromatic hydrocarbons which have a generally applied English name, ending in "*ene.*" Hence benzol and toluol should be respectively benzene and toluene.

Hydrochlorate and Hydrobromate, as representing salts of hydrochloric and hydrobromic acids, are incorrect, and should be hydrochloride and hydrobromide.

Chloral, as a heading for something that is not chloral, but chloral hydrate, is an error. The heading should be "Chloral Hydrate."

Atropine.—Melting point should be 115° C instead of 108° C.

Coca Leaves. Distinction should be made between Erythroxylon Bolivianum (Huanoco leaves) and Erythroxylon Spruceanum (Truxillo leaves), as there is a microscopic difference in the leaves, and a decided difference in the yield of alkaloid. (See Proceedings. American Pharmaceutical Association, 1893, Vol. 41, page 159.) A standard should be adopted for this drug, and a method of assay devised.

Stramonium Seed should be superseded by Stramonium leaves and stems, and this for two reasons. They contain less alkaloid than stems and leaves, and contain so much oil that they make bad preparations to mix with others without precipitation, do not keep well, and require a stronger alcoholic menstruum than the stems and leaves.

Tinctures of Strophanthus and Colchcium Seeds.—The seeds for the preparation of these tinctures should first be deprived of their oil.

Gold and Sodium Chloride.—Why use a mechanical mixture when a definite chemical compound of both exists, the double chloride of gold and sodium, $AuCl_3$. 3NaCl.

Tartar Emetic.—Why Antimonii et Potassii Tartras, when it is known that the compound is Antimonyl Potassium Tartrate ?

Carbonates of Ammonium, Magnesium and Lead are so called when it is known that all are really the basic carbonates, and when the formulas for the basic carbonates are given under the names.

Hydrastis should be assayed and required of a certain strength of hydrastine.

Hydrastine Hydrochloride should be made official, as it is used to a great extent, and much more than the hydrastinine salt.

Powdered Opium Assay,—Insert after "another portion of 10 c.c. of ether" the words, "Let the ether on the filter and crystals evaporate completely," and after the words "more than about 10 c.c. in all," insert the words "use a feather to remove the crystals that adhere to the flask,"

Pilocarpus.—Distinguish between P.-pennatifolius and P.-microphyllus; introduce method of assay, and set up a standard of requirement of pilocarpine for the leaves.

Solution of Magnesium Citrate.—This formula is far from satisfactory. Numerous complaints have been received, and those who are satisfied with the present formula are so only because they have tried no better. In a paper read before the Michigan Pharmaceutical Association by Messrs. A. B. Stevens and W. Palmer, the following formula was presented;

Magnesium Carbonate	13.0
Citric Acid	26.5
Oil of Lemon	0.128
Sugar	62.0
Potassium Bicarbonate	2.0
Distilled Water	s. q.

Dissolve the acid in 250 C.c. of water, add the magnesium carbonate, which has been previously triturated with the oil of lemon. When dissolved filter the solution into a strong bottle having a capacity of 360 C.c. Then add enough water to nearly fill the bottle, drop in the potassium bicarbonate, immediately close the bottle with a cork, and secure it with twine.

Sapo Mollis.—The formula for this preparation is far from satisfactory. The product is unsightly, and upon standing develops an objectionable odor. It is largely used in surgical practice, and the formula hereby offered to take its place has been in use by the Chairman of this Committee for many years :

Olive Oil	1000 C.c.
Potassa	360 Gm.

Dissolve 300 Gm. of the potassa in 2000 C.c. of water, and add 500 C.c. of this solution to the oil in a suitable vessel. Place over a moderate fire, stirring until the mixture has thickened sufficiently. Gradually add the remaining solution of potassa and continue the heat, stirring occasionally until the mixture assumes a transparent gelatinous form. Dissolve the remaining 60 Gm. potassa in 1000 C.c. of water, add to the mass and evaporate to proper consistency. Samples of this preparation, as well as the liniment made from it, are hereby submitted.

Leo Eliel,
Alfred R. L. Dohme,
A. B. Stevens.

Mr. Remington: As this report is largely technical and devoted to the Pharma-

copœia in detail, I move that it be referred to the Section on Scientific Papers for discussion.

Seconded and carried.

The Committee on Nominations, through M. W. Alexander, Chairman, submitted the following recommendations:

President—James M. Good, St. Louis, Mo.
First Vice-President—Charles E. Dohme, Baltimore, Md.
Second Vice-President—Adolph Brandenberger, Jefferson City, Mo.
Third Vice-President—Mrs. M. O. Miner, Lawrence, Kan.
Treasurer—S. A. D. Sheppard, Boston, Mass.
Permanent Secretary—Charles Caspari, Jr., Baltimore, Md.
Reporter on the Progress of Pharmacy—C. Lewis Diehl, Louisville, Ky.
Three Members of Council—Geo. L. Hechler, Cleveland, Ohio, Chas. M. Ford, Denver, Colo., W. J. M. Gordon, Cincinnati, Ohio.
For the Unexpired Term of C. Lewis Diehl, as Member of the Council—J. Burgheim.

These names were received by the Convention with applause, and Mr. Torbert moved that the report of the Nominating Committee be unanimously approved, and that the Secretary of the Association be instructed to cast the ballot of the Association for the officers named in the report.

Mr. Ebert: It has always been customary that we ballot for the President, and then Mr. Torbert's motion would be in order.

Mr. Torbert: Mr. President, I always take my cue in matters of this Association from Mr. Ebert, and I will withdraw the motion.

Mr. Alexander: I move that the Secretary cast the ballot of the Association for these officers. This is an unheard-of proceeding, and the precedent exists only in Mr. Ebert's mind. We have never made any question in the matter at all.

Dr. Bartley: It seems to me that the proper procedure now is to act upon the report of the Committee.

Mr. Torbert: My motion contemplated that, and further action is unnecessary. If the Secretary casts the ballot we adopt the report of the Committee. I think that the Committee did its work well, and that the Association by electing these gentlemen would be receiving as much honor as it bestows upon the gentlemen themselves. I renew my motion that the Secretary cast the ballot of the Association in favor of the gentlemen named, and call for the previous question.

Seconded and unanimously carried.

Mr. Sayre offered the following resolution, and moved its adoption:

"Whereas, The services of Professor Henry Kraemer for the past three years as Reporter on the Progress of Pharmacy have been of exceptional value; be it

Resolved, That the American Pharmaceutical Association extends to him a vote of thanks for his labors in its behalf, and with it give expression to the hope that his European trip may prove eminently successful.

Signed, L. E. Sayre,
A. R. L. Dohme,
A. B. Prescott,
J. U. Lloyd.

The motion to adopt this resolution was seconded and unanimously carried.

The President called for the report of the Committee on Time and Place of Next Meeting, and the Committee reported the selection of Montreal, Canada, as the place, and August 12, 1896, as the time.

After brief discussion as to the proper time for holding the convention, whether at the time named or during the first week of September, the report of the Committee was adopted upon motion of Mr. Alexander.

MR. STILES: I suppose you say now that the Twin City badge should be taken off, but we would merely like to have you imagine that it reads "1897" instead of "1896." (Applause.) We wish you to remember also that one-sixth of the new applications presented to the Association came from Minnesota. We do not want you to think that this was simply a bid for the convention. It is simply the outgrowth of the boom in our own Association, which in the last two years has added 120 members to its organization. The result of that, and the enthusiasm of our members in the interests of pharmacy, have influenced our members to join the American Pharmaceutical Association, and also influenced us to ask you to meet with us. We think that we have as desirable a meeting place as is to be found in the United States, with the exception of the curiosities and things of that character that we find in the extreme west; but as a summer resort Lake Minnetonka and the healthful atmosphere of Minnesota cannot be excelled. Professor Remington met with us there this year, and knows something of these things, and I think he will be willing to endorse anything I have said.

MR. REMINGTON: I feel it is only due to this Association that I should say a few words for the State of Minnesota. I believe that the present Proceedings contained last June but two members from the large State of Minnesota, and this is a section of the country which has never been gleaned by the Committees on Membership of the American Pharmaceutical Association. When the subject of going to Denver for the meeting place was broached, the Minnesota men took it up with great enthusiasm. The Committee on Membership has a list of thirty new members from the State of Minnesota, and I am sure that 100 members stand ready in the northwest to join this Association whenever it is ready to come there. (Applause.) That means a great deal to the American Pharmaceutical Association. I have been to Lake Minnetonka, and I will assure every member of the Association that it is an admirable place, a beautiful lake. I am not going to take your time. Montreal has been decided upon, and was practically selected last year. At the lake they have elegant surroundings, fine hotels, near to St. Paul and Minneapolis, and a fine summer resort away from the dust and noise of the city.

MR. WATSON: It is not exactly in order to do so now, but when we start out on our excursion I move that we give three cheers for Minnesota in 1897. (Applause.)

The Committee on the National Formulary, C. Lewis Diehl, Chairman, made the following report, which, upon motion, was referred to the Committee on Publication.

REPORT OF COMMITTEE ON NATIONAL FORMULARY.

To the American Pharmaceutical Association:

Your Committee on the National Formulary has the honor to present herewith the manuscript for a new edition of the National Formulary revised in conformity with the recommendations made by this Committee, and approved by vote of the Association at Asheville, N. C.

When your present Committee was appointed in 1888, the "Formulary" had just been issued, and embraced practically all preparations that were in established use, and for which no uniform or authoritative standard existed. It was as nearly perfect as a work of this nature can be expected to be, and it did not, therefore, seem likely that an early revision would become necessary. It must be remembered that it represented the accumulated formulas of years for preparations, which, though in current use, could for one reason and another not be admitted into the Pharmacopœia, and it was therefore not to be expected that there would be such an accumulation of additional formulas as to demand a revision in the near future. Nevertheless, it soon became apparent that there was a demand for formulas not given in the "Formulary," and it became necessary to determine how far this demand was justified and in what manner it was best to satisfy it. But here the Committee was confronted with a problem that had not embarassed the former Committee, or had been encountered to a limited extent only in the construction of the "Formulary." If we will look over the four hundred and thirty-five formulas of the present work, we will probably not be able to point out five that do not represent preparations that had previously been the common property of Pharmacists in different sections of our country, or abroad. In all of these instances formulas were either accessible in the current pharmaceutical and medical literature, or, in their revised condition, they were supplied to the Committee. In other words, except in the few possible instances mentioned, the formulas were well established, and bore honest titles.

If the demand upon the present Committee had been for formulas of this kind, that is, for formulas for preparations in current use by pharmacists, generally, in certain sections, or throughout our country, the demand could have been easily met. But the demand was for a class of preparations, the composition of which, though ostensibly given on the label, was carefully withheld, while the title of the preparation was fanciful and evidently coined by the manufacturer, with the assurance that it could not be appropriated by others. In brief, the demand was for formulas for preparations that must be classed among proprietary medicines, and which differ only from so-called patent medicines in that they are prescribed; and, being prescribed by physicians, the demand for formulas to replace them seemed to your Committee to be legitimate. But right here the Committee met with insurmountable difficulties. In the first place, the formulas given on the label borne by these preparations are, in most instances, so vague, that the construction of a working formula for the "Formulary" would in great measure be guess-work. Then the number of these preparations has been multiplied so enormously, and continues to increase so rapidly, that no Committee appointed by this Association can possibly encompass the work, even if the task to construct the formulas were a far simpler one. Furthermore, the Committee was unable to decide among this multitude of preparations where to begin and where to end; many of them being of similar composition, but varying in the proportion of some of their components or flavor, and in dose, while the one appears to find favor with one prescriber, the other with another.

Then, again, the suggestions for additions to the "Formulary" that reached the Committee, were generally vague in their character, and but very few formulas were offered. Those that were offered were, with scarcely an exception, adopted by the Committee, and are embodied in the manuscript herewith presented; yet it is quite possible that other additions might properly have found place in this revision if the proposers of additions had been more specific in their propositions, and had offered to supply the formulas. On the other hand, a considerable number of formulas have been dismissed from the "Formulary," because they have become official in the U. S. P.; but these cannot be regarded as a loss, since they now exist in a more authoritative form, and the "Formulary" must, therefore, still be regarded a gainer to the extent of the new formulas introduced.

It was not to be supposed that so large a number of formulas as are embraced by the

"Formulary," and collected from pharmacists throughout our country, should prove uniformly satisfactory. As a matter of fact, the most frequent complaints that reached the Committee, were made with reference to the imperfections—real or supposed—of certain formulas. These complaints were carefully considered by a Sub-Committee on Corrections of Formulas, and the necessary corrections have been made upon the basis of a report from this Sub-Committee, aided by the experience gained in the examination of the 285 typical specimens of National Formulary preparations, exhibited at the Detroit meeting, and reported upon by this Committee to the Association at the meeting in the White Mountains, in 1892.

Another source of complaint, and one that finds voice quite frequently, is, that too many of the preparations are dependent upon each other; that is to say, that two, three, or more preparations must be made before the one desired can be compounded. While this is true in a restricted sense, it does not entail the hardship or inconvenience that is generally implied in the complaints. In the case of the great majority of the formulas, only a few special preparations of the "Formulary" are so concerned, and these are inexpensive, and are easily kept in a well-assorted stock. A practical pharmacist and teacher, speaking (in 1891) of the profitable use of the "Formulary," gives a list of twenty-three preparations, which, at a cost of a trifling sum, will enable the pharmacist to make most of the preparations requiring special compounds. But even this list is larger than is necessary in practice, for most of the preparations can be expeditiously made with such chemicals and supplies as may be expected in every well-appointed pharmacy, and the following stock preparations:

Aromatic Elixir (United States Pharmacopœia).
Compound Elixir of Taraxacum.
Elixir of Liquorice.
Purified Talcum.
Tincture of Cudbear.
Compound Tincture of Cudbear.
Solution of Cochineal.
Compound Spirit of Orange (United States Pharmacopœia).
Compound Spirit of Cardamom.
Syrup of Coffee.
Tincture of Citro-Chloride of Iron.

And of these only a few are used frequently, the majority being used in comparatively few preparations, but conveniently kept in stock because of their inconvenient preparation at short notice. In formulas in which other preparations of the "Formulary" are concerned, their preparation can usually become part of the process, and this need neither cause confusion, nor entail much extra labor, since reference to the formula for such preparation is facilitated by giving its number as well as the name, while official preparations so directed are followed by the letters U. S. P. Under instruction, also, quantities in these formulas are expressed in the terms of the metric system of weights and measures, and they have been adjusted, wherever practicable, so as to make one thousand grammes or cubic centimeters of the finished product. In the case of expensive preparations, prescribed in small quantities only, or for other reasons, the total quantity has been reduced to one-tenth; while, in certain other preparations, the final quantity of product has been increased to five or ten times that generally given. The conversion from the old system of weight and measure to the new has necessitated some trifling changes in the proportion of some of the ingredients; but such changes were never made when they affected in any degree the strength of a very active preparation, or the proportion of a very potent ingredient. In such cases, the quantity of the active ingredient in the finished product was adjusted to as nearly as possible the absolute proportion in which it was given in the original formula.

While metric weight and measure are used throughout the text of the formulas, it was considered judicious to retain the designation heretofore in use for the explanation, following many of them, of the strength of the finished product, or of a dose of it; the Committee believing that so long as physicians continue to prescribe and to designate doses by the old system of weight and measure, this mode of designating the strength of a preparation will be found most convenient and acceptable.

It has been the endeavor of the Committee to simplify the formulas wherever this was possible, though the general excellence of the "Formulary" in this direction has left very little room for improvement. In conformity with instruction, preference has been given to Acacia as the emulsifying agent for making emulsions. The "Formulary" being intended for the every-day work of the pharmacist, Acacia is by far the best emulsifying agent for the convenient and expeditious preparation of emulsions; and it possesses the further advantage that oily bodies are more perfectly emulsified with this than with any other agent. For special and manufacturing purposes, one of the other emulsifying agents may be desirable, and their use is explained in the Alternative Formula given under "Emulsion of Cod Liver Oil."

The demand made for additional formulas for effervescent powders has been duly considered by the Committee, but inasmuch as no particular combinations were proposed, the Committee was unable to decide in favor of additions. It has been made possible, however, by the introduction of a general formula, for pharmacists to prepare expeditiously any combination of medicinal agents that may be, or may become, desirable in either the pulverulent or granular effervescent form; and in this connection it has been found expedient to make a slight change in the title of these preparations, so that all of them could follow in alphabetical sequence after the general formula, which is given under the title Pulveres Effervescentes (Effervescent Powders). This general formula, being applicable to effervescent powders of every description, has been applied in the construction of the formulas for the effervescent powders that have heretofore been given in the Formulary. In these, effervescence is dependent upon the reaction between tartaric acid and sodium bicarbonate, and they may be prepared either in a pulverulent or in a granular condition, the latter being attained by the use of alcohol to form a pasty mass, passing this through a coarse sieve, and drying the soft granular masses so produced. In practice this has proven an unsatisfactory method for obtaining a granular preparation, and a simpler method has been adopted for the revised Formulary, which consists in substituting for one-half the molecule of tartaric acid one-half a molecule of crystallized citric acid. This produces a slightly damp powder when mixed with the sodium bicarbonate and the other ingredients, and when heated at a moderate temperature causes the particles of powder readily to adhere, and to assume the form of granules under very simple manipulation. When the pulverulent form is desired, tartaric acid alone is used, in quantity to form a neutral solution with the alkali bicarbonate. To further simplify these formulas three new preparations have been embodied in the Formulary, viz.:

Saccharated Sodium Bicarbonate.

Saccharated Citric Acid, and

Saccharated Tartaric Acid.

In these the acids and the alkali bicarbonate respectively bear molecular relation to the total quantity of product and to each other, so that when equal weights of the alkaline saccharate and one of the acid saccharates are dissolved in water a neutral solution results. Obviously a portion of the saccharate of one acid may be substituted by an equal portion of the saccharate of the other. These saccharates keep well, may consequently be kept in stock, and with their aid effervescent preparations may be made expeditiously, the pulverulent form at once, the granular form at short notice. But it is not necessary to keep these saccharates in stock, if not convenient, since by a simple rule, given under the general formula, the quantities of acid and alkali necessary for each formula may easily be ascertained by calculation.

Additional formulas for lozenges were suggested as desirable from several sources, but not one that has called for formulas has considered it necessary to mention the particular lozenge for which a formula was wanted. There are seventeen official (U. S. P.) formulas, eleven (B. P.) formulas, and about eighteen London Throat Hospital formulas, for lozenges, all of which are public property. Besides these, there is a host of special (unofficial) formulas—one manufacturer alone lists about ninety—the composition of which is indicated nearly enough for the Committee to construct formulas; but in the absence of specific demand your Committee decided to embody none in the Formulary.

In conclusion, your Committee feels confident that, though the additions have been few, the revision has been thorough, and that in its revised edition the Formulary will prove an acceptable and satisfactory work. If this is also the view of the Association, it is suggested that the manuscript be referred for early publication, and the Committee discharged.

Respectfully submitted, on behalf of the Committee,

C. LEWIS DIEHL,
Chairman.

MR. HALLBERG: I would make a motion to the effect that the Publication Committee arrange for the publication of this work at the earliest practicable date, and that one dollar be charged for the cheapest bound copy of the "National Formulary."

MR. HECHLER: I wish to inquire if Mr. Hallberg's motion included that it be published in our Proceedings. I think it ought to be published in our next Proceedings, besides being published in book form.

DR. WHELPLEY: I would offer as an amendment to Professor Hallberg's motion that the new revised edition be published in our next Proceedings.

Seconded.

The question being put on the amendment offered by Professor Whelpley to the motion of Professor Hallberg, the amendment was lost by a standing vote of thirteen to twelve.

MR. HALLBERG: As a substitute for the original motion, I move that the report of the Committee on the National Formulary be referred to the Publication Committee, with the request that the Formulary be published at the earliest practicable date: that the manner in which it is to be published and distributed shall be left to the discretion of the Council, with the suggestion that the minimum retail price be one dollar a copy.

Seconded.

MR. BROWN: I want to add an amendment that every member of this Association be granted the privilege of publishing a cheap edition for distribution among physicians.

MR. TORBERT: We have a motion now before us with not less than four or five distinct propositions, some of which are exactly in conflict. For instance, that part of the resolution which recites that it shall be published immediately, and then it is to be left to the Council how it shall be done. Now we understand—

MR. HALLBERG: A point of order. The motion is that the *manner* in which it is to be published and distributed is to be left with the Council.

Mr. Torbert moved to lay the whole matter on the table, to be taken up at a subsequent meeting.

Lost.

The question then recurring upon the original motion of Mr. Hallberg as modified, it was declared carried.

MR. BROWN: I offer a motion that the Council be instructed to permit all druggists who desire to do so, to publish a cheap edition of the National Formulary for distribution among physicians in the country.

DR. HALLBERG: Would accept this as a substitute? That the Committee on National Formulary, in conjunction with the Committee on Publication, be empowered to publish an epitome of the National Formulary for the use of retail pharmacists for distribution among physicians.

MR. BROWN: Provided the price is made not more than ten cents.

MR. SEABURY: I move as a substitute to the motion just made, that it be referred to the Council, with other matters pertaining to the National Formulary.

Not seconded.

DR. WHELPLEY: I move that this Association recommend to the Council and Committee on National Formulary that an epitome of the National Formulary be published for distribution to the pharmacists.

Seconded and carried.

MR. SEABURY: I rise to a question of privilege. The Commercial Section as usual is in a state of irritation, and will be for the next five years probably. We have been disappointed with the members of our Executive Committee; we have only two at the present time, and our number is five. I will ask the Chair to appoint three to act with us on some papers, to be added to the Committee *pro tem*. Of course, if the rest of the Committee appear we shall have no use for the additional members, but if they do not we should like to have their services.

MR. EBERT: A point of order. The point is that the Chairman of the Section is himself the one to appoint.

MR. SEABURY: That is true, but this is a matter that we have never thought of before. What we want in our Section is fair play, and if I select three men I might be accused of partiality.

MR. PRESIDENT: The point of order is well taken. The Chair would rule that that should come up before the Section on Commercial Interests.

Dr. Stewart offered the following resolution, which upon motion of Mr. Ebert, was referred to the Section on Commercial Interests:

Resolved, That the Committee on National Formulary be instructed to publish formulas of popular proprietary medicines, and provide names under which all pharmacists may manufacture and sell them.

Resolved, That the fanciful or trade names be inserted as proper names or synonyms in all cases where said preparations are not already provided with proper names by the manufacturers who introduced them.

The President called for a report from the Committee on the Revision of the Constitution and By-Laws, and Mr. Hallberg said:

The report that I have the honor to present was presented to the Council this morning, and the Council has gone over it very carefully and approved it. The changes proposed are, with one or two exceptions, purely grammatical. About the only important change is changing the title of the Secretary from "Permanent Secretary" to "General Secretary," in order to avoid conflict in the terms applied to the Secretaries of the various Sections, and it is also proposed to eliminate in the Section referring to the election of officers the one sentence which exempts the Permanent Secretary from annual election. Thus he is placed on the same basis with any other officer with reference to election. The only other elimination is Article 5, Chapter 7, which has never been lived up to, that is, that the author of every paper presented to this Association should present a copy of it, and a synopsis of its contents, to the Chairman of the Section on Scientific Papers. Then we have an amendment to distinguish between the various terms, such as "meetings" and "sessions," in order to avoid confusion. I now desire to present this copy exactly in the shape it was passed upon and approved by the Council this morning, and move its reference.

MR. TORBERT: I would like to inquire in regard to the proper procedure. My remembrance is that it would have to lie over, and cannot be acted upon at this meeting.

MR. HALLBERG: I will accept the amendment. Now, there is an addition to the General Rules of Finance, adding Rule 13, which the Council have not passed. Then these other matters here I will briefly refer to, and move that they be referred to the Council: An amendment to the By-Law governing the Transportation Committee: three amendments offered by Mr. Dohme, one in reference to the Transportation Committee; second, that the Chairmen of the various Sections be empowered to refuse any papers that they deem not worthy to be presented; third, delegates not to be eligible on the Nominating Committee until they shall have completed their membership; insert in Chapter 7, Article 2, the following, proposed by Mr. Ebert, that is, with reference to those who are eligible to serve on the Council: "Which shall be selected from such members who have held at least five years' membership in good standing in this Association." Then another one for the Transportation Committee, presented by its Chairman, Mr. Mayo. To Chapter 9 add the following: "The Council may arrange for such social sessions, to be held after the adjournment of the last general session, as it may deem expedient, but no business of the Association can be transacted at such social sessions." And finally I have a communication from the Chairman of the Section on Commercial Interests with reference to the appointment of the Executive Committees of the various Sections, all of which I move be referred to the Council.

Seconded and carried.

MR. OLDBERG: I wish to give notice of an amendment that I shall offer to the Constitution, Article III., relating to the election of officers. It seems to me that it is hardly proper for an Association like this to elect new members, almost the same day that they become members, to high offices in the Association. There have been instances where new members have been elected as Vice-Presidents on the day that they joined the Association, and it seems to me that when electing officers of the Association we should know a good deal about them, and they ought to be members of the Association for at least five years before they are eligible to office at all. I therefore wish to offer that amendment, and, as under the Constitution and By-Laws it has to lie over for one year, I simply give the notice at this time.

THE PRESIDENT: The Chair would state that this must be reduced to writing and handed to the Secretary, so that we may know just what change is proposed to be made.

DR. WHELPLEY: There was one point in the matter of the revision of the Constitution and By-Laws that was not mentioned by the Chairman of the Committee, and that is that the Council was to be increased by three members, the additional members being the Chairmen of the different Sections.

Upon motion, this was referred with the other suggestions of amendments to the Council.

The Secretary read the following telegram:

SHEBOYGAN, WIS., *August 14, 1895.*

TO CHAS. CASPARI, JR., *Secretary American Pharmaceutical Association, Denver, Colo.*:

Wisconsin Pharmaceutical Association sends greeting. H. C. Schrank will meet you as our representative.

A. H. HOLLISTER, *President.*

Upon motion of Mr. Hallberg, the Secretary was instructed to send a suitable message to the Wisconsin State Pharmaceutical Association in reply to their fraternal greetings.

The Convention at 2 o'clock, upon motion, adjourned to meet again on Saturday morning.

THIRD SESSION—THURSDAY AFTERNOON, AUGUST 15, 1895.

No business was transacted by the General Session prior to the meeting of the Section on Commercial Interests.

FOURTH SESSION—THURSDAY EVENING, AUGUST 15, 1895.

No business was transacted by the General Session prior to the second meeting of the Section on Commercial Interests.

FIFTH SESSION—SATURDAY MORNING, AUGUST 16, 1895.

In the absence of President Simpson, the convention was called to order by Mr. Remington, and Secretary Kennedy read the minutes of Council as follows, which, upon motion of Mr. Eliel, were adopted as read.

The Secretary presented nine applications for membership, which, on motion, were recommended to the Association.

Joseph E. Morrison, having been nominated for the position of Local Secretary by H. M. Whelpley, the Chairman, on motion of G. W. Voss, was directed to cast an affirmative ballot for his election.

FIRST SESSION OF THE NEW COUNCIL, AUGUST 15, 1895.

The new Council was organized by the election of Wm. S. Thompson, of Washington, D. C., as Chairman; W. C. Alpers, of Bayonne, N. J., as Vice-Chairman, and Geo. W. Kennedy, of Pottsville, Pa., as Secretary.

The following Standing Committees were appointed:

Committee on Membership: H. M. Whelpley, Chairman; Charles M. Ford, George W. Voss, S. P. Watson, J. Burgheim; George W. Kennedy, Secretary.

Committee on Finance: Charles E. Dohme, Chairman; Joseph E. Morrison, A. Brandenberger.

Committee on Publication: C. Lewis Diehl, Chairman; W. J. M. Gordon, Mrs. M. O. Miner, George L. Hechler, Charles Caspari, Jr.

Committee on Centennial Fund: J. M. Good, Chairman; Charles E. Dohme, Charles Caspari, Jr.

Upon motion of Mr. Kennedy, the seventeen new members proposed at the last general session were invited to complete their membership in the Association.

The Secretary of the Council announced nine applications for membership, which were recommended to take the usual course, subject to the further action of the Convention.

No other business being before the Convention, an adjournment was had, to enable the Scientific Section to hold its first session.

Sixth Session—Saturday Afternoon, August 17.

The Association did not transact any business previous to the second session of the Section on Scientific Papers.

Seventh Session—Saturday Evening, August 17.

On account of the lateness of the hour, no business was transacted by the Association previous to the third session of the Section on Scientific Papers.

Eighth Session—Monday Morning, August 19.

The meeting was called to order by President Simpson at 10:30 a. m.

The Secretary of the Council, Geo. W. Kennedy, read the names of six applicants for membership, which upon motion were directed to be posted in the hall. On motion the nine gentlemen whose names had been presented on Saturday, at the fifth session, were invited to become members.

The Association then adjourned to allow the Section on Pharmaceutical Education and Legislation to hold its first session.

Ninth Session—Monday Afternoon, August 19.

No business was transacted by the Association previous to the second session of the Section on Pharmaceutical Education and Legislation.

Tenth Session—Tuesday Morning, August 20.

Owing to the large volume of business in the hands of the officers of the Section on Pharmaceutical Education and Legislation, the Association did not transact any business previous to the third session of the Section.

Eleventh Session—Tuesday Evening, August 20, 1895.

President Simpson called the convention to order at 8 o'clock p. m. The minutes of the last three sessions of the Council were read by Secretary Kennedy as follows, and upon motion were approved as read.

Second Session of the New Council—August 19th, 1895.

The Secretary presented the names of six applicants for membership, and on motion they were directed to be posted as usual.

The subject of publishing the National Formulary having been referred to the Council by the Association, it was on motion agreed that the report of the Committee, including the revised edition of the Formulary, be published in the Proceedings of the Association, and that the price of the Formulary to members of the Association shall be fixed at fifty cents, each member to be entitled, however, to not more than one copy at such price.

On motion of Geo. L. Hechler, the dues of Karl Simmon, of St. Paul, Minn., and Alfred I. Tartiss, of Newburg, N. Y., were remitted.

On motion of Geo. W. Voss, it was agreed to change the program of the meeting as follows: The final session of the Association to be held on Tuesday evening, at eight o'clock, instead of Wednesday morning at ten o'clock.

The following gentlemen were appointed by the Chair as the Auditing Committee: Charles E. Dohme, Chairman, D. M. R. Culbreth, John F. Hancock.

On motion of Geo. L. Hechler, it was agreed that the money now carried on the books of the Treasurer, under the heading of "Entertainment Fund," be transferred to the "General Funds" of the Association, and that the Treasurer be authorized to invest so much thereof as may be practicable in some interest-bearing security.

Third Session of the New Council—August 20th, 1895.

The Secretary presented one application for membership, which was on motion directed to take the usual course.

The Chairman appointed the following gentlemen as members of the Transportation Committee: Lewis F. Chalin, New Orleans, La.; Albert E. Ebert, Chicago, Ill.; Charles M. Ford, Denver, Col.; W. J. M. Gordon, Cincinnati, O.; Caswell A. Mayo, New York, N. Y.; W. M. Searby, San Francisco, Cal.; Harry Sharp, Atlanta, Ga.; S. A. D. Sheppard, Boston, Mass.; H. M. Whelpley, St. Louis, Mo.

On motion of S. A. D. Sheppard, the Finance Committee was instructed to prepare a list of appropriations covering the balance of the present fiscal year, to be submitted at the earliest possible date to the Council for its approval.

H. M. Whelpley proposed the following amendment to the By-Laws:

Add to end of Section 6, Article XI., old Chapter IX.: "Delegates who are not members, and newly proposed members, must complete their membership before they are eligible to serve on the Nominating Committee,"

The following proposed amendments were not agreed to:

"The Council shall consist of twenty-one members, nine of whom, selected from such members as have held at least five years membership in this Association shall be elected by ballot.

"Delegates shall not be eligible to enter the Nominating Committee until one year after their election as members."

W. C. Alpers, for the Committee on the Ebert Prize, presented the following:

Resolved, That the officers who appoint the members of the different prize committees, as well as the members of such committees, withdraw from competition for the prizes by accepting their respective offices. Adopted.

On motion of Geo. L. Hechler, the Chairman and other members of the Transportation Committee were tendered a vote of thanks by the Council for their arduous labors in perfecting the traveling arrangements for this meeting.

Fourth Session of the New Council.

On motion of W. C. Alpers, it was agreed that any member of the Association, when ordering five or more copies of the National Formulary, shall be put on the same basis as book agents or dealers, and receive them at a discount of 33⅓ per cent., and also that no freight or postage shall be paid on a less number than five copies.

On motion of S. A. D. Sheppard, it was agreed that the price of the Proceedings for 1890 and previous years be reduced one-half.

Upon motion of Mr. Kennedy, the new members proposed at the last session were invited to complete their membership in the Association.

The Secretary read the minutes of the preceding session of the Association, and stated that he had replied to the telegram of President Hollister of the Wisconsin Pharmaceutical Association at Sheboygan, but that the day following he had received a notice from the telegraph office that they were not able to deliver the telegram, owing to the fact that the gentleman had left Sheboygan and gone to Madison. The Secretary further stated that he would write him and forward him a copy of the telegram which had been sent.

The minutes were adopted as read by the Secretary, and the convention then proceeded to the consideration of the report of the Committee on Amendments to the By-Laws.

The Secretary: I would suggest, Mr. President, that the Chairman of the Committee on Amendments to the By-Laws read the amendments which he has brought up, because they are in his own handwriting and interlined, and he can make them out much better than I can; those I have I will read in addition.

Mr. Hallberg: In the Constitution, Article I., paragraph 2, first line, insert "among" instead of "between;" put in "such as will" instead of "which shall," so as to make it read as follows:

"To encourage proper relations among druggists, pharmacists, physicians, and the people at large, such as will promote the public welfare, and tend to mutual strength and advantage."

Mr. Seabury: All amendments to the Constitution must lie over until next year, and I would ask if correcting the grammar of an Article in the Constitution is not really an amendment.

Mr. Hallberg: There is only one more: In Article III. of the Constitution, change the title "Permanent Secretary" to "General Secretary," and strike out "with the exception of the Permanent Secretary," to read as follows:

"Article III. The officers of the Association shall be a President, three Vice-Presidents, a General Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom shall be elected annually; also a Local Secretary to be elected by the Council, and shall hold office until an election of successors."

THE PRESIDENT: The Chair rules that under the By-Laws, these amendments to the Constitution must lie over until our next annual meeting. The By-Laws may be acted upon at the present session, previous notice having been given.

MR. HALLBERG: In By-Laws, Chapter I., as to Presidents and Vice-Presidents, Article I., first line, insert the word "sessions" instead of "meetings," so as to read as follows:

"Article I. The President shall preside at all sessions of the Association, except those of the special Sections, as hereinafter provided. In his absence or inability, one of the Vice-Presidents, or in the absence of all, a President *pro tempore*, shall perform the duties of President."

Upon motion of Mr. Remington, the report was adopted as to this Article.

MR. HALLBERG: In Article II. change the title "Permanent Secretary" to "General Secretary," so as to read as follows:

"Article II. In the absence of the General Secretary, the President shall appoint a Recording Secretary *pro tempore*."

Mr. Remington moved the adoption of the report as to this Article.

THE SECRETARY: Before this amendment is adopted, I would like to call attention to the fact that it would naturally follow the proposed change in the Constitution, if that were adopted. Is it wise to change the By-Laws before we make a change in the Constitution? I think not.

MR. REMINGTON: I don't think it makes any difference. It is only a mere matter of form next year to adopt it. If the Association approves it now, there is so much done for next year. There will not be any objection to it, and as it is in the By-Laws it might as well be adopted now.

MR. THOMPSON: We are spending time debating what there is serious objection to. This by-law if changed would refer to a General Secretary, while in the Constitution the officer is referred to as a Permanent Secretary, and under the Constitution we have as yet no such a thing as a General Secretary. I would move to amend the motion by laying this matter over until next year.

Seconded and carried.

MR. HALLBERG: In Article III. change "meetings" into "sessions," so that the Article will read as follows:

"Article III. In sessions the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports and communications, and order the vote upon all proper questions at the proper time."

Upon motion the report was adopted as to this Article.

MR. HALLBERG: In Article IV. change "ballotings" to "balloting," so as to make the Article read as follows:

"Article IV. In all balloting, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases

he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal, and in case of such equal division the motion is lost."

Upon motion the report was adopted as to this Article.

MR. HALLBERG: In Article V. we have changed the word "meeting" into "members," so as to make the Article read as follows:

"Article V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in cases of personality and impropriety he shall promptly call the speaker to order. He shall decide all questions of order subject to the right of appeal, unless in cases where he prefers to submit the matter to the members; decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order."

Upon motion of Mr. Seabury, the report was adopted as to this Article.

MR. HALLBERG: In Article VII. substitute the word "not" for the word "unless," so that the Article will read as follows:

"Article VII. He shall appoint all Committees not provided for in the By-Laws, or otherwise directed by the Association."

Upon motion of Mr. Eliel, the report was adopted as to this Article.

MR. HALLBERG: Chapter II. pertains to the Permanent Secretary, and the changes in Article I. are materially those relating to the change from Permanent Secretary to General Secretary. Those we will pass. In Article II., Chapter II., we have changed "meetings" to "general sessions;" changed "received by the Association" to "presented to the Association," so as to read as follows:

"Article II. He shall keep fair and correct minutes of the proceedings of the general sessions, and carefully preserve on file all reports, essays and papers of every description presented to the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing and distributing the Proceedings of the Association, under the direction of the Council."

Upon motion the report was adopted as to this Article.

MR. HALLBERG: It is proposed to change Article III. so as to read as follows:

"Article III. He shall read all papers handed him by the President for that purpose; shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act by enclosing a printed slip defining the duty of the committee, and shall notify every member of the time and place of each annual meeting."

Mr. Seabury moved the adoption of the report as to this Article.

MR. THOMPSON: I think it would be well enough to leave out the requirement that he shall enclose a printed slip. This would oblige the Secretary to have a printed slip prepared to notify a member of a special committee of his duties on that committee. The section now requires that he shall notify him of his duties, and I think it should be left optional with the Secretary whether he notify him in writing or by a printed slip.

MR. EBERT: This is a very important feature, and it should be done. I have known

members of a committee to come here and say, while they had received notice that they were on such a committee, they did not know their duties; and it would pay this Association to have these printed slips prepared naming the duties, which are designated in the Proceedings, and a number of copies could readily be obtained from the printer.

MR. THOMPSON: If Mr. Ebert will allow me a moment, this applies to special as well as regular committees, and there are no printed slips in our Proceedings that prescribe the duties of special committees.

MR. EBERT: There are but a few special committees at each meeting, and the Secretary could easily furnish this information to the special committees in writing.

MR. THOMPSON: That is just the point I make.

DR. WHELPLEY: If I may be permitted, I would add as an amendment to this amendment, "or type-wri ten," after the word printed.

MR. GOOD: I do not think we should designate just how the Secretary should notify the members of their duties. Let him use his own judgment.

THE PRESIDENT: That is Mr. Thompson's proposition, as I understand it.

MR. THOMPSON: I move to drop out the requirement that he shall furnish a printed slip, and say that he should notify them of their duties.

Seconded by Mr. Remington and carried.

Upon motion of Mr. Good, the report was adopted as to this Article as corrected.

MR. HALLBERG: Change Chapter III. under Local Secretary, Article I., to read as follows:

"Article I. The Local Secretary shall reside at or near the place where the next annual meeting of the Association is to be held."

Upon motion of Mr. Thompson, the report was adopted as to this Article.

MR. HALLBERG: Change Article III. to read as follows:

"Article III. An exhibition of objects interesting to pharmacists may be held each year under the direction of the Local Secretary and the Committee on Commercial Interests, should the Council so determine."

Upon motion the report was adopted as to this Article.

MR. HALLBERG: Chapter IV. under Treasurer, change Article III., to read as follows:

"Article III. He shall report to the Council, previous to each annual meeting, the names of such members as have failed to pay their annual dues for three years."

Upon motion the report was adopted as to this Article.

MR. HALLBERG: Chapter V. "Of the Reporter on the Progre s of Pharmacy," in Article I., substitute the word "salary" instead of the word "sum," so as to read as follows:

"Article I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services an annual salary of $750."

Upon motion the report was adopted as to this article.

MR. HALLBERG: In Article III., strike out "obituary," as the word "biographical" includes obituary, making the Article read as follows:

"Article III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry and Materia Medica, and the collateral branches of knowledge; on the changes in conditions of Pharmaceutical Institutions; together with such statistical and biographical notices as will furnish an epitome of the progress and changes in the science and practice of pharmacy, and of its votaries, at home and abroad."

Upon motion the report was adopted as to this Article.

MR. HALLBERG: In Article V. strike out the word "command" so as to read as follows:

"Article V. In case of the illness or other disability of the Reporter to carry on the work of the report, the Permanent Secretary and the Chairman of the Council shall be required to make the best arrangements they can to continue the work to its completion."

MR. GOOD: I object to that, as you are using the auxiliary of the verb and leaving the verb to be understood.

Upon motion of Mr. Thompson, the report was rejected as to this article.

MR. HALLBERG: Chapter VI., "Of the Council," in Article I. strike out "shall be," and substitute "is;" also strike out in the last sentence the word "special," and substitute "permitted" for the word "invited," making the Article read as follows:

"Article I. The business of the Association which is not of a scientific character, shall be in charge of a Council, which is empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association. Any member of the Association may attend the meetings of the Council, and may by a vote of the Council be permitted to speak on any subject under discussion."

Upon motion of Mr. Remington, the report was adopted as to this Article.

MR. HALLBERG: Change Article II. to read as follows:

"The Council shall consist of twenty-one members, nine of whom shall be selected from such members as have held at least five years membership in this Association, and shall be elected by ballot by the Association in the following manner: Three of them to serve for one year, three for two, three for three years. At each subsequent annual meeting, three members shall be elected to take the places of those whose terms will then expire, to serve for the term of three years. None but ex-officio members of the Council shall be eligible for re-election thereto until one year after the expiration of their term of office."

MR. THOMPSON: That is a matter of minor importance; it is only intended to make more clear the last clause which now reads "to serve the next succeeding term," and this is intended to make a lapse of one year, so that a member of the Council after being out one year may be re-elected a member of the Council. It is intended to cure that difficulty. The important thing is the qualification that no one shall be elected a member of the Council except he has been a member of this Association for at least five years.

MR. EBERT: I think I am the author of that, and I want to say in support of it that

we should require some qualifications of the members of the Council. I want to say right here that we have on two occasions elected persons on the Council who were not members of the Association. I want to say to you when the committee comes together in order to compliment some one, the Nominating Committee recommends Mr. John Smith for the Council, and the result has been that unless some member objects to it we get into the position of nominating and electing a man as a member of this Council who is absolutely not a member of this Association. Now it should not be that the Council, which is so important a body in looking after the affairs of this Association, should be composed of members elected before they have some idea of this Association and its objects.

MR. REMINGTON: I thoroughly approve of the remarks of my friend Ebert. I do not know of any special instance at this time, but surely a man should be five years connected with this Association before he is fit to be in the Council of the Association.

MR. SHEPPARD: I would favor substituting three years instead of five. I remember several years ago at the meeting in Toronto, a gentleman arose and asked to be excused from acting on the Committee, saying that he had been a member of the Association only three years. Dr. E. R. Squibb, who was then very active in the Association, arose and said that the gentleman had given the very best possible reason why he should act on the Committee; that he was new to the Association, and would be earnest and zealous in his work. There is nobody who is so zealous as a new member. I do not believe in bringing a man in without any experience, but I think three years would be better than five, and I move to substitute three for five in the amendment.

MR. GOOD: I second Mr. Sheppard's motion. I would like to ask whether it is understood how far-reaching this amendment is. The officers, such as the Vice-Presidents particularly, become members of the Council, and are we to understand that they are not eligible unless they have been members of the Association five years?

MR. REMINGTON: The amendment refers to elected members only.

MR. ALPERS: If it is true that parties have been elected to the Council who were not members of the Association, such election was in itself illegal. If we adopt these restrictions as to eligibility to the Council, I do not see any reason why these other members of the Council should not be subject to the same restrictions. This applies only to nine members; the Council consists now of twenty-one members, so that there are twelve members left who need not be three or five year members, whatever the limit may be. It leaves it at our option to elect a member a Vice-President, who has only come into the Association a month before. There are three Vice-Presidents, the Reporter, the Secretary, the Treasurer, and the Chairmen of the Sections. All of these could be elected, although they may have been only one day in the Association. Why should we make this distinction? If there should be such a radical change, make it all through. I wish to point out another thing which ought to be taken into consideration. If we adopt this amendment, we establish two different grades of membership by so doing: one membership which entitles a member to certain privileges, but not to all the privileges of a member; he becomes a full-fledged member after he has been three years in the Association—that is, he becomes eligible to all the offices. Now there is a definition of membership in our by-laws which would be a contradiction to this, and if you change this you certainly must revise the definition of membership or make such a proviso, because, according to that definition of membership a man is entitled to all the privileges of the Association after he has been elected, signed the Constitution and paid his five dollars.

MR. EBERT: There is quite a difference between electing a man a Vice-President or a member of the Council. These men usually serve one year, and we are only burdened with them for that length of time. They give very little attention as a rule to the work of the Council. We sometimes elect a man to office merely as a compliment to the locality from which he comes, and it also happens that regardless of a man's ability, some one gets up and honors a gentleman by electing him to the Council, the most important office you could possibly elect him to. If that is done and the man proves of no value in the position, we are burdened with him for three years, although he does not do any work at all. In relation to the distinctive membership, I am surprised that our friend who is a member of the Board of Pharmacy should make this distinction. Every Board of Pharmacy in this country has a rule as to who shall serve on that Board, and it is generally limited to those who have been registered pharmacists for ten years. Now I believe for the good interest of this Association that a man should not be qualified to be elected a member of the Council until he understands something about the objects of this Association and has thereby become qualified.

MR. THOMPSON: I do not want to take up the time of the Association, but I really consider this matter very important. It is a new department in our management; it is establishing a new precedent, and one that I hope will not be established here to-night. We may make mistakes in electing members of the Council, but the mistake is ours and no one should be blamed but the Nominating Committee for nominating new men to such positions, and we have no one to blame but ourselves if we elect them after they are nominated. We are trying to throw the net around the Nominating Committee by preventing them from doing their duty, so that we need not scrutinize the candidates they present for our suffrage. Now I am unwilling to relieve the Nominating Committee of their responsibility; that is their specific duty. They are to present to this Association men who are fit to become its officers and manage its affairs. Now to say that a man is not fit to be a member of this Council until he has served a membership of three or five years' time, I am not willing to vote for. I think we have gentlemen here to-day who are just as competent to serve as those who have been here twenty years. I have been a member of this Association twenty-one years, and I do not consider myself any better qualified than a man who comes in here to-day to perform the duties that I am called upon to perform; and I move you, sir, that the five years' clause in the amendment now before us be stricken out.

MR. SEABURY: I think this whole matter is clear to all of us. I coincide with both sides of this discussion, and I think my record is clear on that point. The point which has been made is a very excellent one, whether you make it three or five years. So far as the officers are concerned I certainly object to the word "burden" being applied to a new member if elected as Vice-President or any other position outside the Council. But from my experience, covering a period of nearly twenty-one years, it is always a great mistake for the Association to elect into the Council a man who does not thoroughly understand the routine work of the Association. I admit that there are other men who are perfectly able to discuss the business and other matters that come before the Association, but there are a great many points brought up before the Council that we have gone over, which a new member does not understand, and he always wants to know everything about it. I don't care whether you make the time three or five years, but I think an intelligent man who attends the meetings of this Association for three years is quite as good as one who attends five years, but I don't believe any man ought to be elected to the Council unless he is familiar with the routine work of the character that we have had in the past; that is the only position I draw the line on. So far as its application to the other officers is concerned, I object to that because there are new men springing up all the time, excellent men, and young men, too, and I think it is high time to recognize

that element the moment we discover them. We can easily diagnose them. In my judgment, I think instead of being put in the incubator for fifteen or twenty years, their merits should be recognized at once in any position they are fit for. They are the hustlers, the men who do good work for us. It is well enough for us to have conservatism among ourselves; but if there is any conservative work to be done in the Association, the Council is the place to do it.

MR. HOLMES: I would like to say a few words, and offer a suggestion that may cover the ground without reflecting on any one. I do not believe that a member of this Association, no matter how long he has been a member, is competent to take up the work unless he has been attending meetings for several successive years. Now, I have been a member of this Association for twenty-three years. The first ten years I attended regularly. My business was such afterwards that for a time I could not attend; now, I know that last year when I went to Asheville I was not familiar with the work. I caught up again last year, and this year I knew what was coming. To my mind it might be a good idea to so amend this that no member of the Association shall be eligible to election to the Council unless he shall have attended three successive meetings.

MR. REMINGTON: I think both sides would be perfectly satisfied with this amendment if we were to look at it thoroughly and carefully. Now we have the nine members on the Council. I recognize what the gentleman has said, that this is a very important office. It is worth staying all night to fix this, because we will most likely get into trouble in the future if it is not attended to. I am perfectly willing to accept three years. I think three years is long enough, and in answer to the objection that has been made, I would say that it in nowise creates two kinds of members of this Association. It only specifically states the qualifications that shall be required for members to be elected to the Council, and it is a very important thing that the elected members shall have been members of the Association a sufficient length of time to thoroughly understand all the duties that are required, and that is in the direction of sound conservative management and good judgment. Now, in regard to the hustlers, as they have been called, men of energy, make them Vice-Presidents and they go on the Council. That settles that question, put them there. But this Nominating Committee is often times collected together representing all the States, and by the very constitution of that Nominating Committee we happen to get on that Committee men who are possibly for the first time delegates before they become members of the Association, and they come here from certain distant States, and they have to go on the Nominating Committee. Let the nine members who are elected members of the Council have this qualification of three years' membership, and let the rest go as it is, and then both sides will be perfectly satisfied.

MR. ELIEL: I believe we all fully understand this question. There is a great deal of business to be gone through yet this evening, and if we take up so much time on one question, we will not get through at midnight and hardly before daylight to-morrow, and I call for the previous question.

The question recurring upon the substitute motion of Mr. Thompson to strike out the time clause from the previous amendment, a vote was then taken and the amendment lost.

The Chair then put Mr. Sheppard's amendment to the original proposed amendment, substituting the words "three years" for "five years," and the amendment was carried, whereupon the report was adopted as to this Article as amended.

MR. HALLBERG: The next amendment is to change Article III. to read as follows:

"Article III. The President, Vice-Presidents, Secretary, Local Secretary, Treasurer, Reporter on the Progress of Pharmacy, the Chairmen of the Sections of the Association, and the Secretary of the Council, shall be ex-officio membersof the Council."

Upon motion the report was adopted as to this Article.

MR. HALLBERG: In Chapter VII. "Of Committees" change Article I. so that the Committee on Transportation shall consist of eleven members instead of nine.

MR. SHEPPARD: I move that it be made to consist of ten. The idea of making it eleven was that we should have a member in Kansas City and Omaha, but I think on further consideration that we do not need a member at these points, but we do need one at St. Paul, and so if we add a St. Paul member to our present force, we would make it ten.'

MR. EBERT: That was my own recommendation, but I think ten would be better.

MR. GOOD: I think it is bad policy to make a committee of ten; you had better make it an odd number some how or other.

MR. HALLBERG: There is another slight change in this Section: Transpose the Committee on Pharmaceutical Legislation and Education to follow the Committee on Revision of the Pharmacopœia, so as to bring it last in the list of committees containing five members.

Upon motion, the report as amended was adopted as to this article.

MR. HALLBERG: Article V. is to be stricken out, as it has always been a dead letter, and the numbers of the remaining articles are to be changed accordingly.

Upon motion, the report was adopted as to this article.

MR. HALLBERG: In Article IX., which will now be Article VIII., an addition to the duties of the Committee on the Pharmacopœia is to be made at the end of the Article.

Upon motion, the report was adopted and the following addition made to the end of the Article:

"It shall also note errors of any kind found in the United States Pharmacopœia, so as to facilitate and aid the work of the National Committee on Revision of the United States Pharmacopœia."

MR. HALLBERG: It is proposed to change Article X., which will now be Article IX., so as to read as follows:

"The Committee on Transportation, which shall be elected by the Council, shall consist of one member each from the cities of Boston, New York, Chicago, St. Louis, Cincinnati, New Orleans, Atlanta, St. Paul, Denver and San Francisco, and shall act as an Advisory Board in assisting the Permanent Secretary to arrange for Transportation from the different sections of the country to the place of meeting and return."

MR. EBERT: I do not see why the Permanent Secretary, who is located in Baltimore, should be further burdened with the duties of the Transportation Committee. The Local Secretary, wherever he may be, is certainly the officer with whom the Committee should correspond. He is at the point that we are going to, and we should be in correspond-

ence with the Local Secretary, and not with the Permanent Secretary. I believe it is of the utmost importance that that officer should be in communication with the Transportation Committee and not with the Permanent Secretary. I think that it is essential that the Local Secretary remain the person with whom we have our correspondence.

MR. GORDON: The duty of this Committee is to arrange for transportation in the section in which they reside. This is submitted to the Permanent Secretary, and he issues the itinerary for the entire Association. It is better than any other plan I can conceive; the Local Secretary will give such assistance as he can, but the Permanent Secretary issues the itinerary to the entire Association, which is made up by the various members of the Committee, and sent to him by the Chairman; but the Chairman is a useless officer of the Transportation Committee, and, consequently, it might better be sent to the Secretary direct, and it will be taken care of at once.

DR. WHELPLEY: There is probably no committee connected with the Association of greater importance than the Transportation Committee. It is one that touches our pockets, and we feel that our pockets have been touched rather lightly (only half rate) during the past year. So I feel we should be careful to make this committee as efficient as possible. Now the resolution as proposed, is not in accordance with the explanation that has just been given to it. The explanation that has just been given, that each member of the committee shall decide upon a route and send this to the Secretary, who shall publish it, is the practice that we have followed in the past, and we would not need any change in the Constitution or By-Laws if that were the proposed plan. The amendment as proposed says, that this committee shall act as an Advisory Board to the Permanent Secretary, giving the Permanent Secretary the authority and not the committee, and making the members of the committee simply subservient or advisory to that authority. Now, I, for one, feel that this burden should not be put upon the Secretary for two reasons: He has sufficient work, and it is not his duty. He is the clerk of the Association and of all the committees, and should simply continue as such in the future, as he has in the past. I am confident that if the committee fully understood the import of the resolution, that they would see that it does not concur with the resolution that has just been given.

MR. GORDON: The Permanent Secretary has to issue always a notice to the members of the time of meeting, and in connection with that he issues the route of transportation; consequently it really places no burden upon him, because he simply adds what the committee has presented to him. They send it to him after they have made their arrangements, and he simply arranges it and sends it out with his notice of the meeting.

MR. SHEPPARD: As I was the author of this amendment, I feel that I ought to answer Dr. Whelpley. I think, sir, that this movement is one that will certainly be in the right direction, because it is exactly the direction that was intended when this Committee on Transportation was organized. For a great many years the Permanent Secretary of the Association was the only man who did anything in arranging for transportation. As the attendance at the meetings became larger from distant points, it became desirable to assist the Permanent Secretary by having men at the various central points of the country who would have better knowledge of railroad facilities in their section than the Permanent Secretary could have; therefore, this committee was appointed. It was appointed as an experiment. Now it seems to me, sir, that it is not a committee in the ordinary sense of the term; it was never intended as such originally. The members are scattered all over the United States. It cannot get together. It is not possible to act as a committee by correspondence, as is the case with the Pharmacopœia Committee, because the questions must be decided quickly. It is very desirable that some one should have authority to decide the questions quickly. It is not likely that we would ever have a man

as Permanent Secretary who has not good common sense, and it seems to me we can trust our Permanent Secretary to take the advice of the men who are appointed by the members of this Association to advise with him; and that if a member advise a certain route or direction, and gives good and sufficient reasons therefor, which he is likely to do, then the Permanent Secretary can very easily gather up these various questions and put them together, and formulate, with the assistance of this committee, just exactly what we want. There will be one in authority and we shall have no confusion.

MR. EBERT: I believe I can show where Mr. Sheppard is mistaken. The Local Secretary is located at the point where we are going, and really, so to speak, has all the strings in his hands to reach the point we are intended to reach. Now if you make him the officer to whom we all look when we get any arrangements made in the Transportation Committee, and submit it to him, he is in a position not only better than the Permanent Secretary to aid the Transportation Committee, but he is in a position to do just what the Local Secretary in this city has done: he can make arrangements for this Association then in the way of taking excursions in the neighborhood, and be of value to the Association when it reaches the point of meeting. If you give this authority to the Permanent Secretary, with all his duties as such officer, he knows nothing about the conntry and points of interest adjacent thereto, and the result will be that you will not have that efficient work done that you will have if you leave it in the hands of the Local Secretary, whom we always select as a good man at the point we visit.

MR. SEABURY: I have not spoken on this subject yet, and I only speak when I think something is to be gained by it, otherwise I let my friend Ebert do the talking. I have been Chairman of the Transportation Committee of this organization, and I bear out all that Mr. Sheppard has said. It depends entirely on your Chairman and on the men that are appointed on that Committee as to the terms that we get and the ways and means of transporting our various members from all points of the compass to the place of meeting in good shape. There is no question about that, and there is also no doubt but what the Secretary of the Association would be applied to anyway; it would not make any difference if we did have a Committee on Transportation. But this question of transportation has become so prominent in all organizations of this character that all of them have had to make it a standing committee, and I think those who have tried it and appointed the proper persons—that is one of the great pivotal points, to appoint the proper persons and men of good strong business acumen, who have perhaps an influence with the railroad companies or are familiar with transportation lines in their section. Those men always accomplish a great deal in this or any other organization. I also agree that the Secretary of our Association has sufficient labor on his hands, and therefore I think that the point which has been brought up is one that should be sustained from the stand-point of the Committee on Transportation, and it should always have a guiding spirit, a chairman.

DR. WHELPLEY: I have an amendment to offer. The amendment is that we shall change the by-law so that the Local Secretary be made a member of the Transportation Committee and Chairman thereof. The explanation made by Mr. Sheppard shows, as I said, that the resolution means what it says, that is, that the individual members of the Committee shall be simply advisory, and any one who has had experience with railroads must know that they must be in a position to speak with authority and decisively in order to do any work, and each individual member must have that privilege or nothing will be accomplished. Now as an evidence of the success of the Transportation Committee we have the work of the past year, which is the lowest rate ever obtained for any convention coming to Denver. That is due to the Chairman of that Committee. (Applause.) It is true that we must have a Chairman, and we had a Chairman who did that work well, and as a result each one of us is several dollars ahead. Now let us have a

Chairman, but let that Chairman be a man like the man we have had here, who is in the best possible position to act as a Chairman. I hope that important amendment will prevail.

MR. SHEPPARD: I agree to the amendment. I would call Dr. Whelpley's attention to the fact that in a great many cases the Local Secretary is not an active member of the Association previous to the meeting at which he acts. Again, a man may make a very excellent Local Secretary, and not be the right man for Chairman of this Committee by any means.

MR. GORDON: I have been on this Transportation Committee, and I speak from the experience of several years. As a mere Advisory Board there would be but little authority to make arrangements, but I never found any difficulty in going to railroads and making that arrangement. And the value of the chairman is very little I think in connection with it: he is simply a member of the committee, and has no authority in any shape, and it takes time to refer to him what is done by each member of this committee; but if it is referred to the Permanent Secretary at once it could be formulated and sent out to the members without delay. If a member of that committee has no authority to make permanent arrangements for his section of the country, he is of no use on this committee.

The previous question being called for, the vote recurred upon the amendment offered by Dr. Whelpley that the Local Secretary be made a member of the Transportation Committee and Chairman thereof.

The amendment was adopted by a rising vote of 16 in its favor to 13 opposed. Whereupon, upon motion, the report was adopted as amended so far as it pertained to this Article.

MR. HALLBERG: Article II., Chapter VIII., is recommended to be amended by striking out the word "invite" in the seventh line, and substitute the word "elect."

Upon motion, the report was adopted as to this Article.

MR. HALLBERG: Article IV., with reference to life membership, is recommended to be amended by inserting after the words "after thirty-five years $10," the words "also any member who shall have paid to the Treasurer annnual dues for forty years."

Upon motion, the report was adopted as to this Article.

MR. HALLBERG: It is recommended that Article VII. of Chapter VIII., be stricken out, as it is provided for by a preceding By-Law, and that the remaining numbers of articlesbe changed accordingly.

Upon motion, this report was adopted as to this article.

MR. HALLBERG: Chapter IX., of Meetings and Sections in Article XI., Section 6, with reference to the matter of the Nominating Committee, is recommended for amendment to read as follows:

"The President shall call the roll of States represented, requesting each State in turn to appoint two members, the persons so selected to act as a committee to nominate officers for the Association and members of the Council for the ensuing three years; in addition to which he shall appoint five members from the Association at large to act with the Committee."

MR. RYAN: I move to amend it by adding after the words "States," the words "Territories, Provinces of Canada, and District of Columbia."

THE SECRETARY: An addition to this article is to be made at the end of the section just read by Mr. Hallberg: "Delegates who are not members and duly proposed members must complete their membership before they are eligible to serve on the Nominating Committee."

The question then recurring upon the section as amended, and the section being read with the addition as noted by the Secretary, the report of the committee was adopted as to that article.

MR. HALLBERG: The Committee recommends an addition to Chapter IX., to read as follows:

"Article XVI. The Council may arrange for such social sessions to be held after the adjournment of the last General Session as it may deem expedient; but no business of the Association can be transacted at these social sessions."

Upon motion, the report was adopted as to this article.

MR. HALLBERG: It is further recommended to so amend the By-Laws that wherever the term "session" appears, and that term does not apply to a Section, that it be qualified by the substitution of the term "general session."

Upon motion, the report of the Committee as to this change was adopted.

MR. HALLBERG: The Committee also recommends the transposition of the following three chapters:

Chapter VII., treating of Committees, to come after Chapter VIII., treating of Membership, and Chapter IX., treating of Meetings and Sections, so that the present Chapter VIII. becomes Chapter VII., and the present Chapter IX. becomes Chapter VIII., and the present Chapter VII. becomes Chapter IX.

Upon motion, the recommendation of the Committee as to this change was adopted.

The question now recurring upon the adoption of the By-Laws as a whole, the same were adopted as amended during the discussion upon the report of the Committee.

Next in the regular order of business being the Reports of Committees, the Secretary said:

We have not received the usual preliminary report of the Reporter on the Progress of Pharmacy. This is no doubt due to the fact that he is absent from the country, but I will say that the full report is in the possession of the Secretary ready for publication. I simply mention this in case any one is waiting for the report and fails to hear it mentioned. The report was sent to me before I left Baltimore, but no abstract accompanied it, such as it has been customary to read at the annual meetings.

The President called for the report of the Auditing Committee, and Dr. Dohme said:

None of the members of this committee are present here to-night, and I have been requested to hand these reports in. There are three reports: a report on the Treasurer's

accounts and books, a report on the books of the Chairman of the Council, and a report on the books of the Permanent Secretary, and in each case the books have been examined by the undersigned committee and found to be correct in every particular. I will submit the reports.

Upon motion of Mr. Seabury, the reports were received and adopted, reading as follows:

REPORT OF THE AUDITING COMMITTEE.

To the Council of the American Pharmaceutical Association meeting at Denver, Col., August 14, 1895:

The undersigned committee appointed by the Council of the American Pharmaceutical Association to examine the books and accounts of the Treasurer, have performed the duties assigned them, and report that they have found all entries correct and the disbursements to correspond with the vouchers.

Respectfully submitted,

CHAS. E. DOHME,
D. M. R. CULBRETH,
J. F. HANCOCK.

To the Council of the American Pharmaceutical Association meeting at Denver, Col., August 14, 1895:

The undersigned committee appointed by the Council of the American Pharmaceutical Association to examine the books and annual report of the Chairman of the Council, as also the invested funds of the Association, report the same to be correct and agreeing with the books of the Treasurer.

Respectfully submitted,

CHAS. E. DOHME,
D. M. R. CULBRETH,
J. F. HANCOCK.

To the Council of the American Pharmaceutical Association meeting at Denver, Col., August 14, 1895:

The undersigned committee appointed by the Council of the American Pharmaceutical Association to examine the books of the Permanent Secretary, have performed their duties and found the books and annual report correct.

Respectfully submitted,

CHAS. E. DOHME,
D. M. R. CULBRETH,
J. F. HANCOCK.

Mr. Remington gave an abstract of the following report of the Special Committee appointed to look into the status of apothecaries in the United States Army and Navy, and upon motion of Mr. Thompson, the report was received and the Committee continued.

REPORT OF THE SPECIAL COMMITTEE ON THE STATUS OF APOTHECARIES IN THE UNITED STATES ARMY AND NAVY.

Mr. President and Fellow Members of the American Pharmaceutical Association:

We, the undersigned Committee, appointed by our worthy President to secure better professional recognition of pharmacists in the Army and Navy of the United States, beg leave to make the following report:

Our appointments were not made until some time after the adjournment of our meeting last year at Asheville, and we were thus deterred from bringing this matter to the attention of Congress at its last session. Being a short session, crowded and hurried with work, it would not have been an opportune occasion for presenting the subject; besides,

the amount of investigation and preliminary work required was such that we would not have been able to prepare it properly in the limited time at our command.

We have met with the greatest encouragement in every direction. The pharmaceutical journals almost without exception have endorsed and encouraged our work, and our various State Associations and State Boards of Pharmacy have endorsed our work unanimously in every case in which it has been brought before them. We have received resolutions of encouragement and endorsement from the following organizations, and inquiries from a number of others, who write that they will take similar action at their coming meetings:

Georgia Pharmaceutical Association acted May 22, 1895.
Georgia State Board of Pharmacy acted May 20, 1895.
New Jersey Pharmaceutical Association acted May 23, 1895.
Kansas Pharmaceutical Association acted May 23, 1895.
Kentucky Pharmaceutical Association acted May 23, 1895.
Indiana Pharmaceutical Association acted June 4, 1895.
Minnesota Pharmaceutical Association acted June 12, 1895.
Rhode Island Pharmaceutical Association acted June 10, 1895.
New York State Pharmaceutical Association acted June 25, 1895.
Illinois Pharmaceutical Association acted July 24, 1895.

These papers are in the hands of our Chairman, and will be presented to Congress in support of the legislation requested.

We have received a number of ably written letters by both Naval Apothecaries and Hospital Stewards, endorsing our work, and making most valuable suggestions. These we would have embodied in our report, but did not wish to make it too voluminous. The two bills have been drawn up upon the lines suggested by those most familiar with the matter. While we feel that the Pharmacist should have equal rank and pay with the Assistant Surgeon, we have decided that favorable legislation can be more easily secured by being moderate in our requests, and asking only that which we believe no member of Congress who takes the trouble to look into the matter will refuse.

We herewith submit descriptions of the position of the pharmacists in the armies and navies of the various European States. These are:

PHARMACISTS IN THE ARMIES AND NAVIES OF THE LEADING EUROPEAN STATES.

Translated from the Pharmaceutische Zeitung, by Otto Hoffman, A. B., under the direction of Dr. Geo. F. Payne, Chairman of the Committee of the American Pharmaceutical Association, appointed at the 1894 meeting to work for the fuller recognition of pharmacists in the army and navy of the United States.

GERMANY.

The regulations governing the military pharmacists are the same for the different contingents of the German army.

In times of peace the troops are by preference provided with medicines out of the pharmacies and dispensaries in the hospitals of garrisons. Military hospitals that ordinarily contain seven sick persons or more, have a hospital pharmacy; smaller hospitals have a dispensary. The ordinary number of sick persons is supposed to be 4% of the regular garrison. All prescribed medicines and simple pharmaceutical preparations are made in the hospital pharmacies. The dispensary can only dispense simple forms of remedies. Medicines which contain powerful ingredients or are made with difficulty, are taken from the local drug stores.

All pharmacies and dispensaries of military hospitals obtain their medicines from the medical department of the sanitary depot, in connection with the garrison hospital at the chief station of the division. The third army division, which depends for the medicines it needs on the sanitary depot of the body-guards, is an exception.

The sanitary depots buy their stock of medicines at wholesale, but a number of pharmaceutical preparations are also made there. The German Pharmacopœia is the standard authority for the chemical preparations. A special military pharmacopœia is no longer in force.

Pharmacists, who serve one year in the army, are on duty at the hospital pharmacies. Hospitals with an ordinary number of 71 to 120 sick persons, have one army druggist; 121 to 240 sick persons have two army druggists; 241 sick persons or more, three druggists. The druggists are under the supervision of a superior surgeon, who is the director of the hospital pharmacy. The latter is again under the supervision of a chief surgeon.

In the dispensaries a surgeon is on duty for matters relating to the pharmacy. Hospital stewards are detailed both to the pharmacies and dispensaries for their own improvement, and to assist the pharmacist or the surgeon.

The pharmacies and dispensaries are parts of the hospital and garrison, and are carried on independently, just as other military departments.

The drug department of the military depot is likewise under the direction of a superior surgeon. A military pharmacist rendering one year's service, is detailed to the depot. The pharmacists of staffs of divisions exercise the supervision over technical and pharmaceutical matters.

These latter, together with the chief staff pharmacist and the naval pharmacists, constitute the pharmacists of the Army and Navy. At present the following are employed:

One Chief Staff Pharmacist.

Twenty pharmacists of staffs of divisions, for as many army divisions.

Two naval pharmacists.

The chief staff pharmacist is reckoned as one of the civil officers of the military administration and belongs to the military division of the Prussian War department. He has no right to make decisions himself, but only has to make out reports on questions that concern the personal affairs of the active and retired military pharmacists, and on pharmaceutical, chemical and analytical matters. He was raised to his present rank in 1889, his salary remaining unchanged. His initial salary amounts to about 3000 marks (about $750), and may be raised up to 5400 marks (about $1,450). As a rule, he will hardly ever obtain more than the average pay even under very advantageous circumstances, because when he enters the service, he finds 121 men ahead of him on the list. In addition to his pay he receives 900 marks (about $225) for a dwelling. He has no right to wear a uniform. Excepting the first incumbent of the office, the chief staff pharmacist is appointed from the list of active pharmacists of the staffs of divisions.

The pharmacists of staffs of divisions are detailed to the sanitary departments and are subordinate to military officers, but not to the chief staff pharmacist.

Of the twenty pharmacists of staffs of divisions, sixteen are stationed with the army divisions under Prussian control, two with the Bavarian army divisions, and one each the Saxon and Wurtemberg army divisions.

The annual pay of pharmacists of staffs of divisions begins with 1800 marks (about $450), can be increased to 3000 marks (about $750), and averages about 2400 marks (about $600). To the pay is added an extra sum for rent and such things; in Berlin, Strassburg, Metz and Altona, it amounts to 1800 marks (about $450); in other cities, to 900 marks (about $225).

When he is on duty, the pharmacist of staff of division must wear a uniform which is similar to that worn by the police officers in smaller cities and villages. He has no right to expect to be saluted by the non-commissioned officers and the privates. In accordance with an imperial decree only the following are to be saluted as higher military officials: Intendants, intendancy counselor, assessors, auditors, army chaplains, paymasters, chief surgeons and veterinary surgeons.

Only such pharmacists are appointed pharmacists of staffs of divisions as have rendered a year's active service as one year volunteers (it does not matter whether they have done so as military pharmacists or under arms), are free of debt and capable of service in camp. Applicants who can give evidence of further preparation in sciences after having passed an examination (especially chemists) are given the preference.

(For the benefit of foreign readers of the Pharmaceutische Zeitung the following information is given. A certificate of fitness for promotion to the seventh class of a "gymnasium," or a school in which Latin is required, is necessary for admittance to pharmaceutical apprenticeship. After an apprenticeship of three years in a drug store, the first examination must be passed. Then follows a further term of three years as a clerk, then a year and a half of study at a university, divided into three terms. The applicant finally becomes a pharmacist by successfully passing a second examination.)

Of the sixteen pharmacists of staffs of divisions who have positions in the Prussian army, eight have acquired the degree of Doctor of Philosophy, while the others have proved that they have had further preparation in science after they had passed the final examinations in pharmacy.

The pharmacists are not allowed to make decisions, but must only make out reports for the surgeon-general of the army division; and in this capacity they must do the work of the sanitary office concerning the personal affairs of the military pharmacists, whether active or not, and the work connected with providing the army division with surgical dressings, etc., the revision of the accounts of their department, and other things. In the sanitary depot they must secure and examine the stock of medicines and must prepare those pharmaceutical preparations which must be in the military pharmacy. It is also their duty to teach the one-year volunteer pharmacists. Furthermore, they exercise the supervision in pharmaceutical matters over pharmacies, dispensaries, and establishments for the manufacture of surgical dressings for their army divisions. They must visit the military pharmacy at the place where their garrison is, as often as possible. The remaining pharmacies, etc., are inspected every two years in connection with the inspection of the hospitals by the surgeon-general of the army division.

The pharmacist of a staff of a division is finally the manager of the chemical department of the hygienic experiment station. Such experiment stations have been established for all army divisions in connection with the hospital headquarters. Some army divisions have chemical departments called hygienic laboratories. As managers of these chemical departments or laboratories the pharmacists of staffs of divisions must make the chemical examinations connected with the care of the health of the troops and the military jurisdiction, the pharmacognostic examinations and those chemical and hygienic investigations which the ministry of war regard as being necessary for the economic administration of affairs. The pharmacists of staffs of divisions are alone responsible for the correctness of the examinations, and sign the reports alone.

This is, therefore, the only action which these pharmacists can take on their own authority, unless the revision of accounts is considered to be such an independent action. The amount of work done by these men in the laboratories and experiment stations is not less than that which is done by many a manager of the public health office in Germany.

The Pharmacists of staffs and divisions are probably the only lower officials, not only of those in the army, but of those in the civil service, who are allowed to give an independent written opinion on any subject.

The two above-mentioned pharmacists of the imperial navy, with the title of "Pharmacist of the Naval Station," are civil officials, who have a uniform, and also belong to the lower officials with indefinite officer's rank. They must be on duty in the hospital pharmacies, under the supervision of the chief surgeon of the station hospitals at Kiel and Wilhelmshaven. Their duties are to make the medicines for the pharmacies on shipboard

and to make out the accounts; they are assisted by a few subordinates. The revision of the accounts of the naval pharmacies has been given to the Chief Staff Pharmacist in the Prussian department of war. The surgeon-general exercises supervision over the naval pharmacies. The pharmacies on shipboard are superintended by the station surgeon. The pharmacists at the naval stations also make chemical examinations.

The pay of the pharmacists at the naval stations begins with 2100 marks (about $525), and is gradually increased to 3000 marks (about $750). The increase is regulated in such a manner that the pharmacists of the naval stations receive at least the same pay as the pharmacists of staffs of divisions with the same length of service. They obtain an additional amount of 432 marks (about $108), for their rent, and extra remuneration for chemical examinations.

The military pharmacists usually, sooner or later, return to civil life to take charge of a pharmacy. Of the men now in the service, only one has been in it for more than twenty years; the others have not been in it for ten years.

The professional military pharmacists have been assured by the government the right to apply for a license for a pharmacy. An effort is being made by many parties to remove this right. It may be assumed in their favor that they are too little acquainted with the very modest rank and pay of the military pharmacists, because otherwise they would see how little reason they have for their opposition.

The pension of a pharmacist averages about 850 marks (about $212.50), after ten years' service. They receive this pension after they have proved their invalid condition.

The military pharmacists who have only one year to serve in the army are those persons in the army who must perform the pharmaceutical service proper. Only graduated pharmacists can be appointed to such service. The Health Department distributes them in the above-mentioned manner among the various military hospitals that have pharmacies. They do not receive any military training.

They are lower military officials, ranking as sergeants, or lower, and in military relations are subordinate to the senior commanding officer of the garrison; in other respects, to those sanitary officials who are their immediate superiors. The latter are, as a rule, the Director of the Hospital Pharmacy, the Chief Surgeon, or one of two officials, one of whom has the title of "Surgeon General of Brigade." They are not subordinate to the Chief Staff Pharmacists, nor the pharmacists of staffs of divisions, whose orders must however be unconditionally obeyed.

The duties of one-year volunteer pharmacists in a hospital pharmacy and at a sanitary depot, whenever they have been detailed thither, are the following: Some practical pharmaceutical work, book-keeping and minor chemical examinations (milk, water, wine, etc.).

The pharmacist of the staff of division, who is the director of a hygienic-chemical Laboratory, is assisted by a volunteer pharmacist.

The volunteer pharmacists receive instruction regarding the service of a military pharmacist in war and in peace, In garrisons in which there is a Pharmacist of Staff of Division, the instruction is given by him. In other garrisons, where one is not stationed, it is given by a sanitary officer. At the close of their year of service, the volunteer pharcists must take an oral examination. If their conduct has been good, and they pass this examination, they are dismissed into the reserve as Lower Pharmacists, otherwise as Military Pharmacists. Both classes belong to the lower military officials.

After two years of service free from censure, the lower pharmacist can be promoted to the rank of a Superior Pharmacist. As such, he belongs to the higher military officials, who in peace are only subordinate to their superior (military) commanders. Everything that has been said about the pharmacists of staffs of divisions as to rank and title, also applies to the Superior Pharmacists.

Superior, Military and Lower pharmacists together form the "military pharmacists of

the furlough class." They beloug to the members of the sanitary force, but not to the sanitary division. During peace, a transfer from the pharmacists who have been under arms to the pharmacists of the reserves just described, is never permitted. Nor are the latter called on to take part in military field exercises.

In case of a mobilization the pharmacists required in camp are taken from the "military pharmacists of the furlough class." The volunteer pharmacists remain in their previous position.

Pharmacists are employed in war in the following places:

Field Hospitals,
Sanitary Detachments, } Field Pharmacists.
War Hospitals.

Reserve Hospital Depots.

Depots of goods at a central station.

Hospitals for the reserves.

Fortress Hospitals.

Pharmacists are mainly needed in the field hospitals and the sanitary detachments, for each of which one field pharmacist is on the list. He is reckoned among the higher military officials, even if he is only an inferior pharmacist.

The pharmacists of staffs of divisions go along with the army in their previous capacity. Both the latter and the field pharmacists formerly rode on horseback, but now ride in vehicles.

The professional military pharmacists and the superior pharmacists of the reserves can become voting members of the "German Officers' Association" (according to Art. II. of the Constitution and the explanatory letter of the Association, issued on the 21st of January, 1891.) The object of the Association is to "promote the fellowship and the economic interests of the members of the German army and navy, especially to promote the cheap acquirement of articles of clothing and equipment."

As a rule, the District Commanders not only desire that the pharmacists of the reserves take part in the social reunions of the officers of the reserves, but desire it in a form that permits no refusal.

AUSTRO-HUNGARY.

Both in war and in peace the troops are provided with medicines from the military drug stores. In peace the following establishments of this kind exist under the management of the "Directory of Military Medicine" (an Advisory Board of the Imperial Ministry of War and the highest military authority on pharmaceutical matters):

One military depot of medicine.

Twenty-six pharmacies of garrison hospitals.

Eleven pharmacies of garrisons.

The pharmacies of garrison hospitals are in large garrisons, the pharmacies of garrisons in small garrisons. Very small garrisons have no pharmacies in their hospitals, but only facilities for the administering of simple remedies by military surgeons.

All military pharmacies obtain their drugs, chemicals and apparatus from the above-mentioned military depot of medicine, which is located in Vienna; at this place the supplies are partly kept in stock and partly supplied by contract.

The military hospitals without pharmacies take their supplies from the nearest military pharmacy. A laboratory in which pharmaceutical preparations are made according to the regulations of the military Pharmacopœia, is located in Vienna.

The pharmaceutical service in the military drug stores is entirely in the hands of professional military pharmacists, who are assisted by one-year volunteer pharmacists and by members of the sanitary force.

At present eighty-one places, all told, are on the army and navy list; all are occupied; they are as follows:

One director of military medicine, ranking in the 7th rank, as lieutenant-colonel, and as chief staff surgeon of the second class.

Eight administrators of military medicine, ranking in the 8th rank, as major and as staff surgeon.

Twenty officials of the first class, ranking in the 9th rank, as captain of the first class and as regiment surgeon of the first class.

Twenty officials of the second class, ranking in the 9th rank, as captain of the second class and as regiment surgeon ot the second class.

Nineteen officials of the third class, ranking in the 10th rank, as first lieutenants and as superior surgeon.

Thirteen "Accessists," ranking in the 11th rank, as lieutenants and as assistant surgeon.

The director is promoted to the 6th rank (as colonel and as chief staff surgeon of the first class) after a service of three or four years.

Of these eighty-one pharmacists, three assist the director, 5 are in the military depots of medicine, sixty-eight are in pharmacies of hospitals of garrisons and pharmacies of garrisons, and five in the naval pharmacy at Pola. No pharmacists are employed on the ships of the Austrian navy.

The military pharmacists are reckoned among the military officials, and receive the same pay that the officers of the same rank receive. In peace they have no claim to the services of a boy. The officers, however, receive additional pay for personal expenses.

Military pharmacists must wear uniforms when they are on duty. At other times they can go without them, one-year volunteers being excepted.

Non-commissioned officers and privates must salute military pharmacists in uniform.

When pharmaceutical officers and military officials in uniform meet, they must salute each other, the member of the lower class saluting first; if two members of the same class meet, the officials must salute first.

With respect to their management, the military pharmacies are independent institutions. Their managers have the right to make decisions of their own in ordinary matters, and to sign documents. Documents relating to the administering of medicines must be revised by the chief surgeon. The military pharmacies must leave decisions on more important matters to higher authorities, and, as a last resort, to the imperial ministry of war. The director manages all technical, administrative and personal affairs of the military pharmacies. In personal matters he must obtain the assent of the chief of the corps of military medical officers to any action, and on that account must make his proposals to the imperial ministry of war through him.

The obtaining and distribution of a stock of medicine is done by the military depot of medicine, under authority of the Military Medical Inspection Commission. This Commission is composed of the higher sanitary officers, of the officials of the Intendancy, and of the pharmaceutical director, and is presided over by the chief of the body of military medical officers. The director is the permanent reporter of the Commission.

The medical depots and pharmacies are under the management of the respective pharmacists, who are the seniors in rank. The director and the manager, respectively, exercise command over the remaining officials under their charge.

One administrator of medicine assists the director, and in case of the disability of the latter takes his place. The other seven administrators have the management of the pharmacies of largest garrison hospitals. The pharmacies of the smaller garrison hospitals are managed by officials of the first class, and the pharmacies of garrisons by officials of the second class.

In the depot the two pharmacists highest in rank constitute the commission of management, the three highest in rank, the cash commission.

In a pharmacy both of these commissions consist of the two pharmacists highest in rank.

Pharmacies with only one pharmacist are managed by such pharmacist, the cash commission consists of himself and an officer appointed by the Intendancy.

The depot is only subordinated to the ministry of war. In matters concerning the performance of the pharmaceutical service the pharmacies are subject to the chief surgeon of the hospitals; in military matters they are subject to the corps commander; in administrative matters, to the intendancies of army divisions, and in technical matters to the director.

The pharmacists have not only to perform the pharmaceutical service including management and book-keeping, but also to keep a register of the professional pharmacists, the volunteer pharmacists and the pharmacists of the reserves.

Hygienic-chemical laboratories are not connected with the depot or the pharmacies. There is only one, and that is connected with the Military Sanitary Committee in Vienna. This laboratory is managed by a higher military surgeon. But every pharmacy is provided with the apparatus, and the re-agents necessary for making examinations required of its manager.

In the Austrian army, as in the German army, there are besides the one year volunteers, one-year volunteer surgeons, pharmacists and veterinary surgeons.

One year volunteers who have the diploma of a Master of Pharmacy are allowed to serve their term in the army in pharmacies of garrison hospitals as Military Medical Practitioners, and are promoted to the rank of "Accessists," after they have served a year, provided that their conduct had been satisfactory and that they have shown sufficient ability; otherwise they are dismissed as Military Medical Practitioners. The latter cannot be retained for a second year of active service as is the case with the one year volunteers, serving under arms, whose work has not been satisfactory. The practitioners are reckoned among the military officials, and belong to the lowest (12th) rank. Military pharmacists of the reserves are not called to military exercises during peace.

In war the pharmaceutical service must be rendered by the professional pharmacists and the pharmacists of the reserves, supplemented when necessary from the "Landwehr" and the "Landsturm" (general levy of the people).

Military pharmacists seldom apply for license for a pharmacy, because during the time that they can do so they are in satisfactory circumstances both as to rank and to income.

No more preparation is required of military pharmacists than of other pharmacists. For admittance to the profession, passing six classes of the "Gymnasium" is the first thing that is required. After a three years' apprenticeship comes the first examination, followed by two years of study at the university. Candidates who desire a diploma must pass three preliminary examinations and one final examination. The former are passed during the first year at the university, the latter at the close of the second year. The candidates who have passed this last examination receive a diploma as Master of Pharmacy.

ITALY.

Pharmaceutical professional officials exclusively are charged with the pharmaceutical service in the Italian army. There are employed one hundred and six pharmacists, who are officials of the civil service under the ministry of war. They rank as follows:

One chemico-pharmaceutical inspector with rank of lieutenant-colonel.

One chemico-pharmaceutical director, with rank of major.

Six head-pharmacists of the first class with rank of major.

Ten head-pharmacists of the second class with rank of captain.

Seventeen pharmacists of the first class with rank of captain.

Thirty pharmacists of the second class with rank of first lieutenant.

Forty-one pharmacists of the third class with rank of second lieutenant.

The granting of military grades does not carry with it any military dependence, especially not amenability to courts-martial during peace. Military pharmacists have the right,

in peace, to wear the uniforms belonging to their military rank. In war the uniform is required and the pharmacists become amenable to courts-martial.

Only those persons can become military pharmacists who have the following requirements: Citizenship, the diploma of a pharmacist, bodily and moral fitness and an age less than twenty-eight years. Other things being equal, those persons are preferred who have rendered military service.

The admitted applicants are appointed *ad interim* as pharmacists of the third class, and after a year must pass an examination. If they do not take this examination or fail to pass it, they are considered dismissed from the service without any claim to compensation of any kind.

The seniority of those who pass is determined by the examination, and seniority governs the promotion to the rank of pharmacists of the second class.

Pharmacists of the second class can only be promoted to pharmacists of the first class by passing another examination. Of two men who are promoted to the rank of pharmacists of the first class one is promoted according to his seniority, the other according to the mark he received in his examination.

Promotion to the rank of head-pharmacist of the second class depends on seniority; promotion to the rank of head-pharmacist of the first class is governed by the same rule as that to the rank of a pharmacist of the first class.

The director and the inspector are chosen from the head pharmacists of the first class.

In camp, promotions may be made without an examination.

The military pharmacists are employed in peace:

1st. In the military hospitals.

2d. In the Central Military Pharmacy in Turin.

3d. In the Department of Sanitary Inspection of the Ministry of War.

The Chemico-Pharmaceutical Inspector is employed by the Ministry of War, and is entrusted with the management and the supervision of the affairs relating to the military pharmacies; he also acts as adviser in all technical matters.

Four head-pharmacists and five pharmacists are employed under the management of the Chemico-Pharmaceutical Director in the Central Pharmacy which is really a chemical pharmaceutical laboratory.

The four head-pharmacists manage the four departments of the central pharmacy. The four departments are:

1st. A laboratory for chemical and bacteriological examinations.

2d. A laboratory for chemical-pharmaceutical preparations.

3d. A laboratory for the making of surgical dressings and other material for sanitary purposes requisite for mobilization.

4th. A magazine and a shipping department.

As may be seen from the foregoing list of departments, the central pharmacy must provide the hospital pharmacies with drugs, chemicals, pharmaceutical preparations and surgical dressings. The chemical and bacteriological investigations which are considered necessary by the ministry of war, are also made in the central military pharmacy.

In addition to the above, nine pharmacists, officers of the army (to whom the management of accounts is entrusted), are employed in the Central Military Pharmacy under the direction of the Director. A number of workmen are also employed for the performance of the rougher work.

The remaining pharmacists of the army are employed in the garrison hospitals, one at the smallest, and four at the largest ones. The pharmacists in the hospitals are assisted by the Ajutanti di Sanita, who will be mentioned later on.

In the hospitals of garrisons, where very high officers are stationed, the pharmacies are managed by a head-pharmacist. The dispensing of medicines, surgical dressings and

medical instruments and apparatus belongs to the sphere of the pharmacy. One or two pharmacists besides the Managing Pharmacist are employed.

The pharmacists in hospitals at a place where a commander of an army division is stationed, in auxiliary hospitals and in infirmaries, are so distributed that the seniors always have the management of the larger hospitals.

The pharmacists in hospitals are directly subordinated to the chief physicians. In addition to the pharmaceutical service proper, which includes the dispensing of medicines, etc., for the hospitals, for the officials of the army and for the horses, the pharmacists in the hospitals must carry on the entire management and all accounting, as well as the chemical examinations.

In camp, the following military pharmacists are employed:

One head-pharmacist and three pharmacists in each sanitary office. The latter are at the disposal of the Director to supply any demand that may arise in the field hospital.

One pharmacist in each field hospital with 200 beds.

One pharmacist in each field hospital with 100 beds.

One pharmacist in each mountain hospital with 50 beds.

One pharmacist for each hospital train.

Two pharmacists in each reserve hospital depot.

The above mentioned Ajutanti di Sanita are chosen from the sanitary companies; when possible, men with some training are chosen. In the sanitary companies the soldiers at first obtain a military training, and then one which prepares them for attending the sick.

Physicians and students of medicine who have entered the Sanitary Company after they have had the necessary training, are employed in station service. Graduated pharmacists and students of pharmacy are employed in the hospital pharmacies. It seldom happens, however, that there is a pharmacist in a company, because they mostly prefer to serve under arms, whereby they obtain a chance to be promoted to be officers of the reserves. In Italy, the obligation to serve in the army three years is a general one. The right to serve only one year cannot be obtained by all persons who have had a certain education, but only by those among them who can pay a large sum of money.

There are, therefore, no one-year volunteer pharmacists, and no pharmacists of the reserves. Military pharmacists in Italy feel this want, and strive for the introduction of one-year volunteer pharmacists and pharmacists of the reserves, who might act concurrently with the professional military pharmacists.

In the Italian navy thirteen pharmacists are employed, viz.:

1 head-pharmacist of the first class.

2 head-pharmacists of the second class.

1 pharmacist of the first class.

3 pharmacists of the second class.

6 pharmacists of the third class.

Their duties in the hospitals of the seaports (Naples, Spezia, Venice) are the same as those of the pharmacists of the army in the garrison hospitals; besides, they must supply the ships with medicines. On the ships the physicians must perform the duties of a pharmacist.

To become a pharmacist in Italy, it is necessary to be eligible for promotion to the first class of a lyceum or to graduate from a technical school. Then practical training is immediately begun in connection with study at a university, which must last for four years. Graduation from a lyceum and study at a university for five years is required for the title of "Doctor in Chemistry and Pharmacy." An apprenticeship is never required of an Italian pharmacist. His practical training is all acquired in one year of work in a drug store, while he is studying at a university.

No more is required of a military pharmacist than of an ordinary one, except that he must pass an examination after a year of probation.

FRANCE.

All garrison hospitals in France have a pharmacy which provides the army with medicines, and in which pharmaceutical services are performed exclusively by professional military pharmacists. The military pharmacists in France and Algeria obtain the drugs, chemicals, etc., that they need from the Central Pharmacy in Paris and from its branches in Marseilles.

The professional pharmacists are assisted in their services in the hospital pharmacies by military attendants, among whom there are also a few pharmacists who are doing military service. According to the importance of a pharmacy, one to three attendants are detailed to it.

In France there are at present about 185 places for pharmacists of the Army and Navy. They belong to the officers. They rank as follows:

Inspector, as major-general.

Principal of the first class, as colonel.

Principal of the second class, as lieutenant-colonel.

Major of the first class, as major.

Major of the second class, as captain.

Aide major of the first class, as first lieutenant.

Aide major of the second class, as second lieutenant.

It is the Inspector's duty to supervise the hospital pharmacies. He is the superior of all military pharmacists. In the hospitals the latter are besides subordinated to the chief-surgeon, also to the surgeon-general and to the "Comité Consultatif de Santé" in the department of war. They are the superiors of the non-commissioned officers, the soldiers and the subaltern officials.

It is the duty of the military pharmacists not only to perform pharmaceutical duties proper, but also to make all hygienic-chemical examinations requisite for the Army and Navy, especially examinations of water, milk, wine, bread, preserves and cooking utensils. In addition to all this, they must sometimes make meteorological observations.

In the French navy 70 to 80 pharmacists are employed. The order in which they rank is the same as that given above, but the titles are somewhat different. Their duties are the same as those of the pharmacists of the army, but in the pharmacies of the hospitals in the seaports and the French colonies they must in addition take part in cruises when their turn comes.

If several pharmacists are employed in one hospital, the senior is the manager. He stands between the pharmacists subordinated to him and the chief surgeon of the hospital, and is responsible to him for the entire management of the hospital in pharmaceutical matters. He represents the pharmacy of the hospital, and carries on its correspondence. The documents signed by him and intended for other authorities need also to be signed by the chief surgeon.

For several years there have been no one-year volunteers in France, legally at least. In fact, young men with a higher education seem to be dismissed earlier than the others. All able young men, and therefore also the pharmacists, are at first drilled in the use of arms. Then after sufficient training the pharmacists are detailed to offices, hospitals, etc. If the pharmacists are employed in the hospitals during their term of service, they are there reckoned among the hospital assistants. A pharmacist with a first-class diploma can be appointed Aide Major of the 2d class, after he has been dismissed from active service, and as such belongs to the reserves. This rank is closed to pharmacists of the 2d class. These become hospital assistants of the reserves, and in war may be employed as assistant pharmacists.

In war the pharmaceutical service also is by preference performed by the professional pharmacist, by the assistant pharmacists just mentioned only when their service becomes necessary. Besides, there is assigned to each surgeon-general, a professional military

pharmacist (chief pharmacist Major). In accordance with the commands of the surgeon-general he must take care that the sanitary depots within his sphere are reasonably supplied with medicine, and that the necessary chemical, as well as other examinations, are made; he must also execute the special orders of the surgeon-general.

As stated before, there are pharmacists of the first class and of the second class in France. The two classes are only distinguished by their education at school; after leaving school, the same education is required for both classes. Pharmacists of the first class must have graduated from a lyceum (Bachelor of Letters and Science) while those of the second class must have become ready for promotion to the third class of a lyceum. The preparation for the profession begins with an apprenticeship of three years in a pharmacy, followed by an examination. The chairman of an examining board is not a physician, as in Germany, but a professor of pharmacy. The apprenticeship is immediately followed by three years of university study at one of the higher pharmaceutical schools (Paris, Nancy, Montpelier), or under one of the medical faculties, (Bordeaux, Lille, Lyons). An examination must be taken at the end of the first and second years. At the end of the third year a final examination is held. A period of clerkship which is prescribed in Germany, Austria and Russia, is not required in France, either for graduation or for the right of having a pharmacy of one's own.

Not only must the professional military pharmacists have a diploma of the first class, but France is the only great power of Europe which gives its military pharmacists a special training. This is given in the military pharmaceutical school in Paris called "l'Ecole d'Application du Val de Grace." Only pharmacists of the first class who have passed an entrance examination are admitted. They remain in the school one year, and are there instructed in the chemistry of foods, in forensic chemistry and other subjects, and also in book-keeping and riding on horseback. At the end of the year they must pass another examination. They are then appointed aides major of the second class, enter the army to be employed in hospitals, and advance to a position in the army when a vacancy occurs. Five to seven pharmacists do so annually.

The French military pharmacists are highly respected, both in the army and among their colleagues in civil life. *They receive as many distinctions, such as the Legion of Honor and the like, as the active officers and the surgeons.* Although they are the subordinates of the surgeons, *they have the same income, almost the same uniform, the same marks of honor, respectively, as surgeons of the same rank.*

RUSSIA.

The Russian Army and Navy are in peace and in war supplied with medicines from military institutions, which are partly in camp, but mainly in the military hospitals.

The pharmacies in camp obtain their entire stock from the depots for military medicines of their districts. There are six depots of the kind in European Russia, namely, one each at St. Petersburg, Moscow, Kiew, Bobruisk, Stauropol and Tiflis. Each of these depots is managed by a pharmacist as director. Each body of troops sends its orders by the proper agent to the military medical managers of its district, and the chief of the district, the medical inspector, provides for the filling of the orders at the depot for medicines. The quantity and the kind of medicines to be made are prescribed in so-called catalogues.

Regimental surgeons direct the pharmacies in camp. They are assisted by hospital stewards. Professional military pharmacists are not employed in these pharmacies, but there are among the hospital stewards pharmacists who render their term of military service as deputy hospital stewards.

In the pharmacies of the hospitals the pharmaceutical work is under the management of the professional military service, and is performed by it. There are such hospitals

in every military district. These hospitals are separated from the troops, and have a special staff of surgeons, pharmacists and administrative officials employed in them. The hospitals are divided, according to their size, into four classes. Those of the first and second class have each two professional pharmacists, those of the third and fourth classes, which are mostly university towns, have four each. There is generally only one pharmacist in those hospitals which are too small to be in any of the above four classes. If there are several pharmacists in one hospital, one of them is the manager and superior of the others.

The pharmacists in the hospitals only obtain drugs and chemicals from the depots for medicines, while they make tinctures, plasters, salves, etc., themselves.

In the hospitals with four pharmacists, one is manager, the second prescription clerk, the third chemist, and the fourth book-keeper. In hospitals with two pharmacists, the manager must also do the work of the chemist, and the prescription clerk that of the book-keeper.

The pharmacists are assisted by hospital stewards. These men are prepared in military institutes in a course of four years, have at first the rank of privates, then become hospital stewards with the rank of non-commissioned officers, and finally become hospital stewards of rank (becoming members of the 14th rank). In former years they were admitted at the universities to the study of pharmacy, their services in the military hospitals being counted in their favor as an apprenticeship in pharmacy. This permission was abolished about seven years ago. Sometimes pharmacists are assisted by deputy hospital stewards.

About 130 professional pharmacists are employed in the Russian Army. Like the surgeons they belong to the military officials. Their immediate superior is the chief surgeon, of the hospital, the one next above the latter, the military medical inspector of the district. In the naval hospitals naval pharmacists are employed, who have the same income as corresponding military pharmacists. No pharmacists are employed on the vessels of the navy.

While the surgeons of the army are divided into six classes, the pharmacists are divided into the following three classes, which correspond to the three lowest classes of surgeons:

First Class—Chiefs of depots for medicine.

Second Class—Managers of the pharmacies of classified hospitals and the larger non-classified hospitals; and the older pharmacists in the depots for medicines.

Third Class—Managers of the pharmacies of the small non-classified hospitals, the prescription clerks, chemists, and book-keepers in the hospital pharmacies, and the younger pharmacists in the depots.

All officials in the Russian civil service and army are classified in fourteen ranks, which have nothing to do with the classes just given. Pharmacists belong to classes five to ten. "Counsellor of State" is the highest title obtainable by a pharmacist by virtue of his rank.

The pharmacists of the hospitals cannot make independent decisions or carry on independent correspondence, such things depending on the chief surgeon; nor do the pharmacists have independent representatives at the District Administrations and the Central Medical Administrations. The Secretaries there employed are the technical advisers of their medical superiors, like the Staff of Division Apothecary in Germany.

The Russian military pharmacists have to perform pharmaceutical work only. They are not called upon to do chemical work and the like. There are no one-year volunteer military pharmacists in the German sense in Russia. The clerks are drawn into military service and are first drilled in the use of arms. Then they are employed as substitutes for hospital stewards in the pharmacies of the military hospitals. They are finally dismissed as military pharmacists of the reserves.

Masters of pharmacy are free from active service in the army and are at once reckoned among the reserves. They are not summoned into camp during peace.

When the army is mobilized, each army division receives a pharmacist. In the hospitals that are formed professional military pharmacists are employed by preference. Their places are then taken by pharmacists of the reserves.

The preparation required for a pharmacist who wishes to have the right to have a pharmacy of his own is almost the same in Russia as in Germany. The licensed pharmacists are known by the designation "Provisor." A special examination must be passed to obtain the degree of Master of Pharmacy, as follows: The candidate must write two essays under surveillance and perform some practical work in the laboratory of a university. After the examination has been passed the report on the practical work is published and publicly defended by the author.

ENGLAND.

England, too, has special pharmacies for her army. They obtain their stocks of drugs, chemicals and pharmaceutical preparations from two large drug stores. There are no central institutes for providing military pharmacies with drugs.

These pharmacies are under the management of physicians, who are assisted in the delivery of drugs by "Compounders." Real professional pharmaceutical officials or even trained pharmacists are not employed in the English army, if only those are reckoned as pharmacists who have passed a major or a minor examination. A "compounder" has the rank of a private and can be promoted to a corporalship. Of course this "compounder" is subject in all things to the surgeon, who can employ the "compounder" in attending the sick or in assisting him in surgical operations.

The "compounder" is at first enlisted for six years, like all other soldiers, and becomes entitled to a pension after serving twenty-five years. Before he can enter, the "compounder" must pass an examination in reading, writing and arithmetic. He then receives instruction, and after serving six months must pass an examination in Latin and "pharmacy," on instruments and in single-entry book-keeping.

From this it can be seen that there are no professional pharmacists in the English army, and the "compounders" are not looked upon by pharmacists as members of their profession.

In the navy, however, some qualified pharmacists are employed to manage and to perform the pharmaceutical service in the naval hospitals. There are fourteen such pharmacists in all, four in Haslar, three in Plymouth, and one each in Haulbowline, Chatham, Malta, Cape of Good Hope, Hong Kong, Bermuda and Jamaica. They are officers of the civil service without military rank, and, therefore, cannot be compared with the professional pharmaceutical military officials of the states previously considered.

The naval pharmacists who are alone must have passed the major examination. Where there are several together, only the Director of the Pharmacy (the First Dispenser), must have passed the major examination; the others only need to pass the minor examination.

In England, a special education for entering pharmacy is not required by law. A young man becomes an apprentice, generally for three years, without being asked how long, if at all, he has been at school. During this time, or only after a long period of clerking, he passes a preliminary examination, for which some knowledge of English grammar, arithmetic and Latin is required. Very little knowledge is necessary for passing this examination. Some who take the examination do not trouble themselves about Latin grammar, but content themselves with learning a few chapters of Cæsar by heart. Passing the examination entitles the candidate to call himself "clerk."

The "minor examination" is a public examination, and is about equivalent to the German "clerk examination." Passing it, qualifies the candidate for the management or ownership of a pharmacy.

It depends entirely upon the pharmacist, whether he will take the major examination or not. The only advantage it confers is that a pharmacist who passes it is looked upon as a pharmacist of the first class (pharmaceutical chemist) by the other members of the profession. Whence he has obtained the necessary knowledge, only concerns the candidate. No proof of study at a university is required for this examination.

For many years the Pharmaceutical Society of Great Britain has been seeking to bring about a re-organization of pharmacy, and especially legal regulations governing the course of education of pharmacists. A bill which was introduced in Parliament in 1891, requiring a practical preparation of three years in a pharmacy and proof of successful attendance on lectures on chemistry, botany and pharmacy, was admitted to a first reading, but was not further considered.

BELGIUM.

In Belgium not only the active members of the Army, but also their families and servants, and also the workmen on the government railroads, are provided with medicines from the military pharmacies.

These military pharmacies are in the seventeen garrison hospitals of the country. The pharmacies' stock of medicine and pharmaceutical instruments and apparatus is obtained from the Central Pharmacy of the Army in Antwerp.

The pharmaceutical service is performed almost entirely by professional military pharmacists, assisted by pharmaceutical assistants and by hospital stewards. The military pharmacists in the hospitals are subordinated to the chief surgeon, who directs the sanitary service both of the hospital and of the garrison.

The above-mentioned Central Pharmacy is also directed by a military pharmacist; another military pharmacist is detailed to the General Inspectorate of Military Sanitary Matters.

The military pharmacists belong to the officers with the following rank:

One Director of the Central Pharmacy, chief pharmacist, with the rank of lieutenant-colonel.

Two Principal pharmacists with the rank of major.

Nine pharmacists of the first class with the rank of captain of the first class.

Seven pharmacists of the second class with the rank of captain of the second class.

Nine pharmacists of the third class with the rank of 1st lieutenant.

Nine pharmacists of the fourth class with the rank of 2d lieutenant. (Making thirty-seven in all.)

The pharmaceutical assistants who were mentioned above, and from whom the military pharmacists are taken, comprise the following persons:

Four assistant pharmacists of the first class.

Four assistant pharmacists of the second class.

Seventeen auxiliary pharmacists (scholars).

Forty "Eleves Pharmaciens Aspirants" (pharmaceutical scholars preparing themselves as pharmacists in the army).

In addition to services properly in the pharmaceutical line, the military pharmacists must also make all hygienic-chemical examinations necessary for the good of the army.

The course of education of Belgian pharmacists has been newly regulated by the law of 1890. By it graduation from a college called "College Royal," or "Athenee Royall," is required for admittance to the profession. Preparation for the profession begins with study at a university, which for two years is confined to natural science in general, to chemistry, physics, botany, zoölogy, mineralogy and geology, and to philosophy. Then the first examination must be taken; everybody who passes this examination becomes a "Candidat en Sciences Naturelles." To obtain the diploma of a pharmacist he must study two years longer, devoting most of his time to the study of the sciences relating directly

to pharmacy. During these two years the candidates also receive their practical training in a pharmacy. Finally after passing a second examination they receive the diploma of a pharmacist.

The course of preparation of the military pharmacists is the same, except that they receive their practical training in the pharmacy of a military hospital. They become "Eleves Pharmaciens Aspirants" in one of the latter after they have received the diploma of a pharmacist.

HOLLAND.

In Holland and in the Dutch colonies the troops including the officers generally receive their medicines from the military pharmacies in the garrison hospitals. If troops or an officer on duty are at a place which has no military pharmacy, the medicines are taken from an ordinary pharmacy. If troops are accompanied outside of their garrison by a surgeon, he gives the simple kinds of medicines out of a medicine chest which is taken along.

In the Dutch colonies in the East Indies only very small garrisons are without surgeons and military pharmacies. In such cases the commander of the garrison has the necessary medicines at his disposal. The military pharmacies in the Dutch East Indies, on the other hand, also give the non-military inhabitants medicines on payment.

The medical pharmacies in Holland obtain their stock of drugs, chemicals and pharmaceutical preparations from the "Imperial Medical Central Station" in Amsterdam.

The medical pharmacies of the Dutch East Indian Colonies receive their stock from the "Imperial Medical Central Station at Batavia."

The military pharmaceutical service, both in Holland and in its colonies, is performed in all important hospitals by military pharmacists. In the small hospitals the surgeon assisted by hospital stewards gives the simple medicines.

The military pharmacists in Holland and in the Dutch colonies, without exception, rank as officers, and belong to the body of sanitary officers, which consists of

Surgeons,

Military pharmacists, and

Military veterinary surgeons.

All in all, the Dutch state has at its disposal with the army, the navy and the colonial troops, eighty-three professional military pharmacists, comprising the following classes:

Land army:

One directing pharmacist with the rank of a lieutenant-colonel. He is at the head of the Imperial Medical Central Station, at Amsterdam.

Eighteen pharmacists of the first class, three of whom have the rank of a major, the others that of a captain.

Ten pharmacists of the second class with the rank of a first lieutenant.

The pharmacists of the second class are promoted to the first class after ten years, if there is a vacancy.

In the army thirty hospital stewards are employed.

Three pharmacists are employed in the navy, namely:

One pharmacist of the first class with the rank of a captain.

Two pharmacists of the second class with the rank of a first lieutenant.

The following pharmacists are with the colonial troops in Dutch East Indies:

One directing pharmacist of the first class, with the rank of a lieutenant-colonel.

One directing pharmacist of the second class, with the rank of a major.

Fifteen pharmacists of the first class, with the rank of a captain.

Thirty-one pharmacists of the second class, with the rank of a first lieutenant.

Three pharmacists are employed in the West Indies, namely:

Two pharmacists of the first class, with the rank of a captain, in Surinam.

One pharmacist of the second class, with the rank of a first lieutenant, in Curaçao.

Since other than Dutch pharmacists can be employed in Dutch East India, and formerly at least were employed, it may be interesting to learn the annual salaries of military pharmacists in East India. They are as follows:

Directing Pharmacist of the first class, 9,000 guilders, about $3,600.00.

Directing Pharmacist of the second class, 7,800 guilders, about $3,120.00.

Pharmacists of the first class, 4,800 guilders, about $1,920.00.

Pharmacists of the second class, 2,700 guilders, about $1,080.00.

To this is added a free dwelling or a compensation for such, which ranges between 500 and 2000 guilders ($200 to $800) according to rank and garrison.

All Dutch military pharmacists enter service at once as first lieutenants, in consideration of the time spent in preparation for their duties.

The Major-General Inspector of the Medical Service of the Land Forces is at the head of the entire Dutch military sanitary system, and, therefore, also the highest superior of the military pharmacists. He is advised in technical matters by a pharmacist of the first class.

Five pharmacists are employed in the Imperial Medical Central Station in Amsterdam viz.:

One chief.

Four pharmacists of the first class.

The chief is the director of the Imperial Medical Central Station and is directly subordinate to the Inspector. The four pharmacists of the first class are subordinate to the chief and are divided among the departments as follows:

One is in the department of medicines and for making pharmaceutical preparations.

One in the hygienic-chemical laboratory.

Two are in the department of administration.

The remaining twenty-three pharmacists of the army must perform service in the garrison hospitals. Their immediate superior is the chief surgeon of the hospital.

In Dutch East India the following pharmacists are employed in the Imperial Medical Central Station of Batavia:

One Directing Pharmacist of the second class as chief.

One pharmacist of the first class.

One pharmacist of the second class.

In addition, there is quite a large hygienic-chemical laboratory under the direction of a Directing Pharmacist of the first class, assisted by a pharmacist of the second class. The remaining forty-three pharmacists are divided among the garrison hospitals. A surgeon, with the rank of a colonel, is at the head of military sanitary matters in Dutch East India.

The three military pharmacists of the Dutch navy are employed in the harbor hospitals in Amsterdam, Hellevoetsluis and Willemsvord, and they must perform the same duties that the military pharmacists perform in the garrison hospitals, besides fitting out the ships with stocks of medicine. They do not go on cruises. On shipboard the pharmaceutical duties are done by the surgeons.

The military pharmacists of the navy and the army, and those in the West Indies, are not specially prepared for their duties. Ordinary pharmacists who have graduated, and are well recommended, without further ceremony receive appointments as pharmacists of the second class as soon as a vacancy occurs. As soon as they have entered the service, they receive compensation for the expenses incurred by them while they were studying.

The pharmacists for the East Indies are prepared at government expense in an institution in Utrecht before they belong to the army. Ordinary pharmacists are only appointed when there is not a sufficient number of scholars to fill all places. Two scholars are taken into the institute every year. They there receive the same instruction, and

must pass the same examinations as ordinary pharmacists. Till 1885, pharmacists who had not been able to meet all requirements demanded in Holland, were sometimes employed in the East Indies. They always remained pharmacists of the second class, unless they passed an examination to prove that they had the required knowledge of chemistry, botany and other sciences.

In Holland, only one class of pharmacists is at present brought up. Graduation from a college, a "citizen school," or a "progymnasium" (lower kind of college), or the passing of a literary and mathematical examination, is required to enter the profession.

The preparation for the profession begins with two years' practical experience in a pharmacy, closing with an examination. Then follows study for three or four years at a university. During this time four examinations must be passed, viz.:

1st. An examination in natural science.

2d. An examination in pharmacognosy.

3d. An examination in theoretical pharmacy.

4th. An examination in practical pharmacy.

When the fourth examination has been passed, a pharmaceutical diploma giving an unqualified right to manage a pharmacy, is granted.

Just as in Belgium and in Italy, the chief stress of the entire pharmaceutical education is also in Holland put upon study at a university. In the examination the candidate must prove his practical ability by the compounding of prescriptions and pharmaceutical preparations; as for the rest, apart from the required experience in a pharmacy, it remains with each one to obtain his practical knowledge, when and where he can.

SWITZERLAND.

During peace there are no military hospitals in Switzerland, no more than a standing army in the German sense exists there. Universal military service is indeed strictly enforced, but the military exercises are confined to periods of a few weeks.

Those who become sick receive their medicine out of an ordinary pharmacy and medical treatment in ordinary hospitals, with which contracts have been made.

Therefore only one professional military pharmacist is employed in Switzerland, viz., the Staff Pharmacist with the rank of a major.

He is at the head of the military pharmaceutical affairs in peace and in war, and the technical adviser of the highest military authorities in the army, the Chief Field Surgeon of the military department.

He agrees upon a military medical tariff with the Swiss Pharmaceutical Association, and submits it to the Chief Field Surgeon for his approval. He is the expert for the examination of medicines that are delivered, of medical bills, and for chemical examinations. He also has some other duties.

Provision has been made for the calling together of a sanitary force, in case war should occur. This force is organized as follows:

1st. Sanitary officers,

(*a*) Surgeons.

(*b*) Military pharmacists.

2d. Sanitary Forces.

(*a*) Non-commissioned officers,

(*b*) Attendants on the sick.

(*c*) Carriers of the sick.

In war the Swiss army has the following pharmacists at its disposal, viz.:

One staff pharmacist.

Eight pharmacists of camp hospitals.

Forty ambulance pharmacists.

The military pharmacists, who without exception have officers' rank, are prepared in

peace in so-called "Schools for the Preparation of Sanitary Officers." The courses last thirty-four days. Some physicians are also called to these schools. A special uniform with marks indicating their rank is granted to the military pharmacists. After the military pharmacists have become prepared, they are summoned to receive courses with the troops with whom they belong, and must become familiar with their duties in camp hospitals and ambulances.

The education of a Swiss pharmacist is the following (graduation from a college being the necessary preliminary): Two years' practical experience in a drug store, and passing an examination, entitles a man to be clerk. Then follow one year as clerk and two years of study, ending with an examination, in which, in some respects, more is required than in Germany.

Nothing further is required of a military pharmacist.

NORWAY.

The organization of sanitary matters generally, and of pharmaceutical matters especially, in the Norwegian army, closely resembles that of the Swiss army, and has been in force since 1887.

Military service in Norway is about the same as in Switzerland. There are military hospitals, but no military pharmacies.

In peace, only one professional military pharmacist, with the rank of an officer, is employed, and he is stationed with the staff. He is subordinate to the "Chief of Military Sanitary Matters," whose adviser he is in all pharmaceutical matters. Every spring he takes the necessary medicines for the medicine chest of the battalion out of an ordinary pharmacy. The chests are taken to the parade grounds at a distance from a garrison. If their contents do not suffice, medicines are bought in a local pharmacy.

For use in camp, nine sanitary detachments and forty-five camp hospitals are formed; pharmacists are only employed for the hospitals, one for each. Besides, five pharmacists are employed in the medical depot.

The camp pharmacists receive their preparation during peace. All medical men and pharmacists are taken into the sanitary department, as far as they are fit. It is a separate division of the army; a sanitary general is at its head. The sanitary officers are detailed by him to the various divisions, exercises and hospitals. The sanitary troops, commanded by a sanitary lieutenant-colonel, form a corps. Medical men and pharmacists are, during the first year, trained in recruit schools for forty-two days, and in company drills for twelve days. Then, if the necessary ability has been shown during the exercises, the so-called "Corporal School" of thirty days follows. After they have in the following years served as corporals in the sanitary divisions, those who have the diploma of a physician or of a pharmacist are required to take a six weeks course in Christiania, whenever this is deemed necessary, and are then made "Sanitary officers." In peace they are called upon to do duty as sanitary officers. From these the "active sanitary officers" are chosen.

For entrance to the pharmaceutical profession the so-callled "Intermediate School" examination, corresponding to fitness for the second-class of a German "gymnasium," is required. Three years' experience in a pharmacy, followed by an examination, is required for a clerk. Then follow one year of clerkship, a year and a half or two years of study at a university, an examination in pharmacy, and finally another clerkship of two years after the examination.

SWEDEN.

Military service is the same as in Norway and Switzerland. Only in the Military Hospital in Stockholm is there a special military pharmacy, which provides the troops of the garrison of Stockholm with medicines. The manager is a pharmacist employed by the government. The stock of drugs and chemicals is obtained from a pharmacy in Stockholm at wholesale prices.

The pharmacist of the Military Hospital has neither the rank of an officer, nor a uniform. He is assisted by the physicians, pharmacists and sanitary soldiers, who are undergoing military exercises.

The pharmacists who are necessary in war are trained with the sanitary troops.

Fitness to enter the third class of a college is required for entering the profession. Three years of practical experience in a pharmacy, closed by an examination, are followed by employment as clerk for two years, and study for two years at the University Institute in Stockholm. The right to manage a pharmacy can then be be acquired by passing the first examination.

DENMARK.

In this country, during peace, the troops are supplied with medicines from the ordinary pharmacies. There is only one military hospital, that of Copenhagen, in which a military pharmacist is employed. All other hospitals obtain their stock of medicines from ordinary pharmacies; the surgeons themselves dispense domestic remedies.

On the ships of the Danish navy the surgeons are also the dispensers of medicines.

During their term of military service, the pharmacists may, according to their preference, be either soldiers or hospital stewards. If, as is the rule, they choose the latter alternative, they are employed in a hospital for four and one-half months, and receive a military training in the sanitary detachment for two and one-half months.

No provision seems to have been made for camp pharmacists who have already been appointed, and by a special training made fit to be employed during a war.

For entrance to the profession, graduation from a classical college is required. The special education begins with three and one-half years' practical experience in a pharmacy, ending with an examination, which is held twice a year in Copenhagen. The Examining Board consists of two Examiners, one of whom must be a pharmacist, and of two "Censors." A candidate who has passed is designated as an "Examinatus Pharmaciæ." At present the university can then be entered immediately. Beginning with the year 1896, a period of clerkship of one year will be required.

At the university the students are obliged to take the course of the pharmaceutical institute, which begins on the 1st of November of each year, and is concluded on the 22d of December of the following year. Then a final examination follows; those who have passed receive the designation of "Candidatus Pharmaciæ" and obtain the right to manage or own a pharmacy, provided that they are twenty-five years old.

In these various countries the pharmacist is held in high estimate, and ranks with the surgeon. His rank, title and pay shows the esteem in which he is held. The United States require much of the pharmacist, and give him little acknowledgment in return either in rank or pay. Among the prominent civilized countries, slow and conservative England and the United States are the only ones which do not give proper professional recognition to their pharmacists. The following excerpt from a recent number of the "British and Colonial Druggist" shows how the English pharmacist chafes under the unjust and degraded position in which his government has permitted him to remain while the remainder of the world has acknowledged his professional status. This is the Article:

"*The Military Pharmacist.*

"The medical staff corps man is a soldier first and a compounder afterwards, and the same duties, often of a menial character, await the enlisted pharmacist as are performed by the youth from the ploughshare or carpenter's bench. The nations of Continental Europe award their military pharmacists a totally different standing. There he is an officer with a definite rank. In most of these, including Germany, Italy and Austria, a colonel's grade is the blue ribbon to which the soldier-pharmacist may aspire, while in France and Russia he may even attain to the dignity of a general. With regard, therefore, to the different position of pharmacy in our army to that held by it in most

countries of the civilized world—the United States forms the sole prominent exception—we unhesitatingly affirm that our soldiers are entitled to as much care as the civilian portion of the population, and that a legislature which insists that the dispenser of medicines in civil life shall be an educated man is acting inconsistently in leaving the compounding for the men who fight the country's battles in what must be, very frequently, very incompetent hands. In the old days, when the army medico was an old apothecary —half surgeon, half pharmacist—the system probably worked fairly well; but in these times, when each year more is demanded of the medical man in branches far removed from pharmacy, the army surgeon becomes each year less competent to supervise that branch of the healing art which properly comes within the pharmacist's province; and until something is done—we fear, however, that the day is far distant when the change will come—to place the pharmaceutical department of the service on a basis more resembling that obtaining abroad (outside the United States), until then this department will compare unfavorably with those of foreign nations. Truly, they manage these things better in France."

The United States requires much of her hospital stewards; some of the requirements are as follows:

(Extracts from the Hand Book for the Hospital Corps, by Smart.)

"Par. 10. The rules and regulations for the government of the Hospital Corps of the Army, provided for by the Act approved March 1, 1887, recognized the higher status which the exigencies of our service imposed upon the hospital steward, for they require that all hospital services shall be performed by the members of the corps, so that what the medical officer is unable to do from lack of assistance must be offset officially, as it has heretofore been offset unofficially, by the ability and intelligence of the hospital steward and attendants; and to insure that this ability shall not be wanting on the part of the steward, provision is made for a searching examination into the qualifications of every candidate for stewardship.

"Par. 17. At all posts the steward must be an efficient discipliniarian, expert clerk and accurate arithmetician; a trustworthy pharmacist, with as much knowledge of materia medica, therapeutics, and minor surgery as will enable him to give sound advice and suitable treatment in the minor ailments and accidents which in civil life rely as often on the resources of the domestic medicine as on the knowledge of the nearest pharmacist, but which at a military post are invariably referred to the steward. And, in addition, he must have that higher knowledge, for use in the wards, which enables the experienced nurse to appreciate the condition of those who are seriously ill, that their improvement may be fostered and all harmful influences excluded. But at small posts, when, during the temporary absence of the medical officer, he is the highest professional authority present, the unforeseen casualties, and even many of the exigencies of military life, impose duties upon him, the satisfactory performance of which may be of the first importance to the individuals concerned.

"Par. 20. His studies reach into the province of the medical officer on all sides to a distance which is measured only by his assiduity, intelligence and capacity. The more he knows of the human body, its ailments and the accidents to which it is liable, the more he can do to relieve suffering, and, in emergencies, to save life; and as these are the objects of his studies, there can be no book-mark to limit them. There is no royal road to knowledge, but some pathways are easier than others, and these the medical officer can point out. The libraries of the Medical Department are provided with everything needful in the way of books for the progress of these studies.

"Par. 43. Intelligence is required on the part of the men not only to understand, but to teach, for the system adopted involves transmission of knowledge from those who have been advanced to those who are accepted from the ranks to fill the vacated positions. The acquirement of information bearing on the management of sick and wounded,

and the method of turning such information to practical account when called for by the requirements of the occasion, are the objectives of the corps; and their pursuit, as may be readily appreciated, tends not only to prepare the hospital establishment for efficient service in the undesired event of war, but to perfect it in the discharge of its current work."

The hospital corps of the army consists of privates, acting hospital stewards and hospital stewards. All enlistments are for the grade of private. On first enlistment as private the pay is $18.00 per month, second year $18.00 per month, third year $19.00. When one becomes an acting hospital steward he secures $25.00 per month the first year, $25.00 a month the second, and $26.00 a month the third. When one finally becomes a hospital steward he obtains $45.00 per month the first year, the same the second, and $46.00 a month the third. On re-enlistment the pay increases from $2.00 to $4.00 a month each, reaching in the most extreme case only to $50.00 a month to the hospital steward as he enters his sixth year of service.

In addition to their pay, members of the Hospital Corps receive as liberal quarters, rations, clothing and bedding, as the other enlisted men, which in the case of hospital stewards, would give a total sum equivalent to about $80.00 a month. Privates who have served one year with particular merit may in some cases secure assignment, as acting hospital stewards upon successful examination, and acting hospital stewards who have served one year with special fitness, may in some cases be promoted to the position of hospital stewards, after passing an examination before a Board of Medical Officers. The results of the examination by the board are entered upon a merit roll, furnished for that purpose by the Surgeon-General, under the following headings: 1. Physical condition. 2. Character and habits, especially as to use of stimulants and narcotics. 3. Discipline and control of men. 4. Knowledge of regulations. 5. Nursing. 6. Dispensary work. 7. Clerical work. 8. Principles of cooking and mess management. 9. Hospital Corps drill. 10. Minor surgery and first aid, including extraction of teeth.

Written answers on the following subjects are also required: 1. Arithmetic; 2. Materia Medica; 3. Pharmacy; 4. Care of sick and ward management; 5. Minor surgery and first aid; 6. Elementary hygiene. Proficiency in penmanship and orthography are estimated from the papers submitted.

A candidate for examination and first enlistment as apothecary in the United States navy must be a graduate of some recognized college of pharmacy, and must be between twenty-one and twenty-eight years of age.

Apothecaries for duty on cruising vessels are enlisted for three (3) years' general service, and receive the benefits of honorable discharge and continuous service. Those for duty on receiving and stationary ships, or for duty on vessels of the Fish Commission, are enlisted for one (1) year special service; those for duty on vessels of coast survey will be enlisted for the cruise, not to exceed five years.

When practicable, applicants for the position of apothecary will be examined by a board of three medical officers.

Applications for first enlistment as apothecary must be referred to the Bureau of Navigation.

Candidates must pass the usual physical examination, and must present testimonials or certificates as to character, good habits and sobriety. They are also required to pass a satisfactory examination in the following subjects, viz.:

(1) *General Education.*

Arithmetic, orthography, writing (legible and grammatical), geography and history of the United States.

(2) *Professional.*

Materia Medica.—A knowledge of the botanical names, origin, habitat, preparations, and doses of the drugs recognized by the Pharmacopœia.

Pharmacy.—A knowledge of the various pharmaceutical processes employed in the manufacture of the various officinal and official preparations, and the relative proportions of the more important drugs entering into the composition of these preparations.

Chemistry.—A knowledge of chemical symbols, the formulas of the more important official chemicals, and of the reactions produced by the combination of chemicals.

Toxicology.—A knowledge of the symptoms of toxic doses and antidotes of poisons.

The recognition of crude drugs, the making of ordinary pharmaceutical preparations, the compounding of prescriptions, and the criticising of prescriptions incorrect by reason of pharmaceutical or chemical incompatibility, or from dangerous doses.

A practical knowledge of bandaging, minor surgery, application of dry and wet cups is desirable, for which the applicant will be given due credit.

Candidates for appointment as hospital steward of the Marine Hospital Service must present evidence of good moral character, and pass a satisfactory examination before a medical officer of the Service, as to their qualifications in arithmetic, orthography, chemistry, pharmacy and book-keeping. The compensation when appointed is at the rate of $480 per annum, which is increased to $600 and $700 per annum after one and two years' satisfactory service.

In the Navy the apothecaries are enlisted men, their monthly pay is $60.00. They are outranked by the boatswains, gunners, carpenters, and sailmakers who are warrant officers; the latter also receive a monthly pay of from $75.00 to $150.00.

In the Army the hospital steward is required to be a man of many parts. Besides all that is expected of the private, he must know how to control men, must understaad nursing, must be familiar with dispensing, must be a good bookkeeper, understand cooking, must have a good knowledge of minor surgery, first aid to the wounded and extraction of teeth; he must also be posted in materia medica, and pharmacy. *Besides this, during the absence of the surgeons he is expected to act in their capacity.* The hospital steward's position is one which requires his constant service as a pharmacist, not to speak of his many other duties. The present system both in the Army and Navy is musty with the by-gone condition of things. Hospital stewards are not recognized by the United States as pharmacists or apothecaries, yet they do the pharmaceutical work for large numbers of our citizens. If they are not properly educated to do this work, the United States is violating the laws of nearly every State in the Union. If they are well-fitted for these duties, as they undoubtedly are, the United States still refuses near the end of this 19th century to recognize a pharmacist professionally as does nearly every State in the Union. Pharmacists now respectfully request the United States not to rank them lower than the mechanic arts, and yet, at the same time, require the highest professional services but to give them rank commensurate with their attainments.

In the Navy the title of Apothecary is used, but the rank and pay are below that of the sailmakers, carpenters, boatswains and gunners.

The two following bills are suggested as most likely to secure favorable action from Congress, and excite the least opposition.

While the rank is not as high as we would desire as professional men, it will be higher than at present, and the pay will be better.

These two bills are yet open for suggestions and changes. Such suggestions should be addressed to our Chairman.

We have received promises of support from a number of the highest officials of our government, and several pharmacists are members of the incoming Congress. With our moderate requests for a better status properly listened to, and the active support of the pharmacists of the Union urging such legislation, we feel most hopeful of success.

The two bills are as follows:

A BILL

To Organize the Hospital Corps of the Navy of the United States, to Define Its Duties and Regulate its Pay.

Section 1. Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, that the hospital corps of the United States Navy shall consist of baymen apprentices, baymen second-class, baymen first-class, and pharmacists; and all necessary hospital service at naval stations on shore, and receiving ships, training ships and sea-going ships of navy (including ambulance service shall be performed by the members thereof, who with the exception of pharmacists, shall be regularly enlisted in the naval service. Said corps shall be permanently attached to the Medical Department of the Navy, and shall not be included in the effective strength of the Navy nor counted as a part of the enlisted force provided by law.

Sec. 2. That there shall be as many pharmacists warranted as in the judgment of the Secretary of the Navy the service may require, but not more than one pharmacist shall be stationed at any hospital, laboratory, station or ship, without special authority of the Secretary of the Navy.

Sec. 3. That baymen of the first-class of the hospital corps may be detailed as active pharmacists by the Secretary of the Navy, upon the recommendation of the Surgeon General, whenever the necessities of the service may require it, and, while so detailed. they shall be allowed the rate and pay of a pharmacist.

Sec. 4. That no person shall be warranted as a naval pharmacist except as hereinafter provided, unless he be a graduate in pharmacy, or has served by continuous enlistment as bayman apprentice, bayman second class, and bayman first ciass, and shall have passed a satisfactory examination before a Board to be designated by the Honorable Secretary of the Navy as to his qualifications for the position; and no person shall be eligible for such examination except by written authority of the Secretary of the Navy.

Sec. 5. That the Secretary of the Navy shall be empowered to enlist and cause to be warranted as many men in the hospital corps as the service may require, and to limit or fix the number, and make such regulations for their government as may be necessary; and any enlisted man in the navy shall be eligible for transfer to the hospital corps as a bayman apprentice. Upon enlistment or transfer, as bayman apprentice in hospital corps, they shall be admitted for instruction to the training schools for nurses authorized by this act to be established by the Secretary of the Navy at the principal naval hospitals. While undergoing instruction th y shall perform duty as ward-masters, cooks, nurses, and attendants in hospital, and as stretcher-bearers, litter-bearers, ambulance attendants, and such other duties as may, by proper authority, be required of them. If found unfitted by any cause to receive instruction or to perform intelligibly the responsible duty of attending to sick and wounded men, the fact shall be reported to the Secretary of the Navy, who shall authorize their discharge from the service.

Sec. 6. That the pay of the baymen apprentices of the hospital corps, first enlistment, shall be eighteen dollars per month. That the pay of baymen, second class, if continuous from first enlistment, shall be twenty-two dollars per month. That the pay of the baymen, first class, if continuous from first enlistment, shall be twenty-five dollars per month.

Sec. 7. That all benefits derived by existing laws, or that may hereafter be allowed by the law to other enlisted men in the navy, shall be applied in the same manner to the enlisted men in the hospital corps of the navy.

Sec. 8. That upon the passage of this act, all apothecaries at that time serving in the United States Navy shall be placed upon the list of warrant officers with rank, pay and privileges of same, with the title of naval pharmacists, and their names shall be entered in the order of their admission to the service.

Sec. 9. That nothing in this act shall deprive an enlisted or appointed apothecary of a warrant as a naval pharmacist, and that they shall retain their position in the Hospital Corps of the Navy, and shall be eligible for duty both ashore and afloat.

Sec. 10. All pharmacists who shall have served the time required by law shall, upon their written request, be placed upon the retired list of the Navy as provided for other warrant officers; and those who, upon the passage of this act, shall have reached the age of sixty-two years, shall be placed on the retired list of the Navy, with the pay of a warrant officer, retired, of the highest class.

Sec. 11. That all acts and parts of acts, in so far as they contravene the provision of this act, are hereby repealed.

An Act to Organize the Hospital Corps of the Army of the United States, to Define its Duty and Fix its Pay.

Sec. 1. Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, that the Hospital Corps of the United States Army shall consist of pharmacists, hospital stewards and privates; and all necessary hospital services in garrison, camp or field (including ambulance service) shall be performed by the members thereof, who shall be regularly enlisted in military service; said corps shall be permanently attached to the Medical Department, and shall not be included in the effective strength of the Army nor counted as a part of the enlisted force provided by law.

Sec. 2. That the Secretary of War is empowered to appoint as many pharmacists as, in his judgment, the service may require; but not more than one pharmacist shall be stationed at any post or place without special authority of the Secretary of War.

SEC. 3. That the pay of the pharmacists shall be seventy-five dollars per month, with the increase on account of length of service, as is now or may hereafter be allowed by law to enlisted men. They shall have rank with sergeant-major and be entitled to all the allowances appertaining to that grade.

SEC. 4. That no person shall be appointed a pharmacist except as further provided in this act, unless he be a graduate in pharmacy and shall have passed a satisfactory examination before a board to be appointed by the Honorable Secretary of War, as to his qualifications for the posttion; and no person shall be designated for such examination except by written authority of the Surgeon-General.

SEC. 5. That the Secretary of War is empowered to enlist, or cause to be enlisted, as many privates of the hospital corps as the service may require, and to limit or fix the number and make such regulations for the government as may be necessary; and any enlisted man in the army shall be eligible for transfer to the hospital corps as a private. They shall perform duty as ward-masters, cooks, nurses and attendants in hospitals, and as stretcher-bearers, litter-bearers and ambulance attendants in the field, and such other duties as may by proper authority be required of them.

SEC. 6. That the pay of privates in the hospital corps shall be eighteen dollars per month, with the increase on account of length of service as is now or may hereafter be allowed by the law to other enlisted men; they shall be entitled to the same allowances as a corporal of the arm with which they are on duty.

SEC. 7. That the privates of the hospital corps may be detailed as hospital stewards by the Secretary of War, upon the recommendation of the Surgeon-General, whenever the necessities of the service require it; and while so detailed their pay shall be twenty-five dollars per month, with increase as above stated. Hospital stewards, when educated in the duties of the above position, may be eligible for examination for appointment as pharmacists, as above provided.

SEC. 8. That upon the passage of this act all hospital stewards now in the United States army shall be placed upon the list of pharmacists with the rank, pay and privileges of the same, and their names shall be entered in the order of their admission to the service.

SEC. 9. That all acts and parts of acts in so far as they contravene the provisions of this act, are hereby repealed.

The splendid annual reports made to our Association on the Progress of Pharmacy have excited our admiration and pride. Our work upon the subject of the status of the pharmacist in the Army and Navy of the United States makes us almost feel that our report should be called the lack of progress in the recognition of pharmacy by the United States.

Respectfully submitted, on behalf of the Committee,

GEORGE F. PAYNE, *Chairman.*

DR. WHELPLEY: In a letter from Dr. Geo. F. Payne, Chairman of this Committee, I find the following referring to this report: "I suppose it will be simply ordered printed in the Proceedings. We ought to have 500 copies printed for the members of Committees, members of Congress and the Journals that wish to use it."

MR. SEABURY: I move that the recommendation be acted upon by the Association and such copies printed. I make that motion as a member of that Committee from New York.

MR. HALLBERG: In connection with this subject a resolution has been prepared by Hon. R. A. Sauerhering, who represents the 4th District of Wisconsin in the next Congress. I will read it if there is no objection.

To the Honorable the Senate and House of Representatives of the United States in Congress assembled:

The undersigned respectfully pray your honorable body to make the following enactment:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

That on and after the passage and approval of this act, the rank of an Apothecary or Pharmacist in the service of the Navy or Army and Marine Hospital Service of the United States, shall be that of a Commissioned Officer.

And that the pay of an Apothecary or Pharmacist in the service of the Navy or Army

and Marine Hospital Service of the United States shall be the same as is paid to persons in civil life, of whom the same responsibility and ability is required, as laid down in the Regulations of the Navy Department of the United States.

Upon motion of Mr. Thompson, the communication was referred to the Special Committee on the Status of Apothecaries in the Army and Navy.

Dr. Whelpley: I move that the Chairman of the Committee be supplied with 500 copies of the paper as published in the Proceedings. We can have them struck off from the pages set up in the Proceedings.

Mr. Mayo: To facilitate action, I move to amend that motion by the addition of the words "that the thanks of the Association be tendered to the chairman of this committee for his most excellent service in this connection." It is one of the most admirable reports ever made to this Association.

Seconded and unanimously adopted.

The Secretary then called for the report of the Committee on President's Address.

Mr. Alexander, the Chairman, being absent, the following report was read by Mr. Alpers, and, upon motion of Mr. Seabury, the report was received and adopted.

REPORT OF THE COMMITTEE ON THE PRESIDENT'S ADDRESS.

The Committee to whom the President's address was referred respectfully report that while it contains many admirable suggestions, there is but one recommendation in it, which is contained in the following resolutions:

Be it Resolved by the American Pharmaceutical Association, that in the opinion of this body the best interests of pharmacy as a profession demand that a definite minimum standard of preliminary general education of all persons entering drug stores to learn the art of pharmacy ought to be enforced by the Boards or Commissioners of Pharmacy of the respective States, and that the preliminary education possessed by all such persons ought to be at least equivalent to that required for admission to the public high schools;

Resolved, That all persons applying for registration as pharmacists or assistant pharmacists should be required to give satisfactory evidence of sufficient general education, by examination or otherwise, and should not be registered or licensed as pharmacists or assistant pharmacists if deficient in that respect; and,

Resolved, That a copy of this resolution be transmitted by the Permanent Secretary of this Association to each Pharmaceutical Examining Board or Commission or Board of Pharmacy in the United States.

Your Committee heartily approve of these resolutions, and recommend their adoption.

Your Committee further recommend that a vote of thanks be given to the retiring presiding officer for his able address and his excellent recommendation.

M. W. Alexander, *Chairman.*
Joseph P. Remington,
William C. Alpers.

Mr. Seabury: As Chairman of the Section on Commercial Interests I desire to say that that Section has asked for an appropriation of $200. We have had nothing for two years, and I think we are entitled to something. I notice that the other Sections have spent money, and we have not spent anything; but this time we are going to do some

work, and we want you all to assist us a little bit, and $200 is a very modest sum to ask for work for county, State and local organizations throughout the country.

DR. STEWART: For the purpose of having it discussed, I move that the appropriation of $200 be allowed the Committee on Commercial Interests.

MR. SHEPPARD: We have adopted a new system in regard to our expenditures, which is that the Finance Committee of the Council shall prepare a list in regard to the expenditures for the coming fiscal year; the Council has also adopted this present year an order to the Finance Committee instructing them to make appropriations for the balance of the fiscal year. This would properly come to the attention of the Finance Committee when they are carrying out these instructions, and, therefore, I move that the motion be amended so as to refer it to the Finance Committee.

Seconded.

MR. HALLBERG: Would Dr. Stewart accept an amendment that the Association approve of it and refer the matter to the Finance Committee.

DR. STEWART: I will accept that.

The question being upon an amendment that the matter be approved by the Association and referred to the Finance Committee, the amended motion was carried by a rising vote of 16 in favor to 11 opposed.

MR. SEABURY: Allow me to make this matter a little more clear. The Commercial Section has devised ways and means for expending this money. They anticipate that it is going to be needed during the coming year, and before we can carry out our contemplated plans we must know whether we are going to be allowed this $200. If we did not have the money and plenty of it I would not say a word, but as a matter of fact we ought to know before we leave here whether we are going to have the money or not. This is a mere matter of form, and you might just as well appropriate it right now, and we will accomplish something which will be worth a thousand times that amount.

THE PRESIDENT: The Chair would rule that debate is out of order, as the question has already been referred.

MR. GOOD: Having voted in the affirmative on this question, I move for a reconsideration of the vote in the interest of fairness.

Mr. Thompson moved to lay the motion to reconsider on the table.

The motion to table was lost, and the question recurring upon the motion to reconsider, the motion was adopted.

MR. GOOD: I called for a vote on the original motion to refer this matter to the Finance Committee; I did not move for a reconsideration for the sake of opening up the argument but I want the members to vote understandingly, that is all.

MR. SEABURY: Now, Mr. President, I ask this General Session to appropriate $200 for the Commercial Section, which they have already deliberated upon and passed unanimously, for reasons that have already been explained.

MR. SHEPPARD: This is the rule adopted at the second session and known as the 13th rule of the Finance Committee:

"The Finance Committee shall each year, previous to June 1st, present to the Council for its consideration a list of appropriations to cover the various expenditures of the com-

ing fiscal year, the total of such appropriations to be based on the probable amount to be received from annual dues for the coming year. No payment shall be made in excess of said appropriations except by special vote of the Council."

Now, Mr. President, I think I can explain the status in a very few words. For many years up to the present time we have been running on what for a better phrase I would call a "go as you please" basis. Every officer, every Committee and every Section have done the best they could to economize as far as possible. We have been quite fortunate in our financial arrangements up to two years ago. Our expenditures and our income have very nearly tallied; at least so nearly that there was no necessity whatever for any special attention to this lack of system, because we got along very well, we were so nearly even in expenditure and income. But about two years ago there seemed to come over the Association a sort of a wave of extravagance, and it seemed to come into everybody's mind that we had lots of money and could afford to spend it freely. The result of that has been that during the last two years our expenses have exceeded our income each year by about $1300. This was not a very serious matter to the Association, because we had a fairly good balance, but it is an easy matter to see that the continuation of any such expenditures would very quickly run us into a very bad financial situation. Hence the adoption of this plan, which was not a hurried thought but has been very carefully considered by a great many members of the Council throughout the whole of the last twelve months. In other words, it is bringing our expenditures down to a system which is adopted by all governmental bodies, municipal organizations, State governments and National governments—simply putting the Finance Committee or some responsible body in a position to formulate the list of expenditures in advance, so that we may know just about where we are going to come out. This is the first case that has come up, and as the plan only goes into operation at this meeting, it seems to me that we should not step right over it at the first move, but that we should refer this matter to the Finance Committee and if the Chairman of the Section on Commercial Interests can show to the Finance Committee that this is an expense that is very urgent, unquestionably the Finance Committee will cut somewhere else and vote for this appropriation.

MR. SEABURY: I wish to say to you, sir, and to the members of this organization, that if any extravagance has taken place in its expenditures it has not been in the Commercial Section. The Commercial Section has made more money for this organization by the bringing in of new members and by that sort of thing than all the other Sections combined, and they have asked for less. If we had been improvident in the past or had no surplus to fall back on, I should have said nothing, especially when the insignificant sum of a couple of hundred dollars was brought into the question. If I had asked for two thousand dollars for our Section, and if that had been appropriated, perhaps it might have been expended in some other direction, what I would call a useless expenditure that brought no return; but the Section is doing good work, and this money that we ask to be appropriated is going to do work which will bring in more members. We have a sinking fund of over $10,000, and there are something like 260 new members altogether, and I am astounded to think that any member of the Association would stand up and stickle at the appropriation of the paltry $200 asked for by this Section.

MR. HECHLER: I wish to ask you a question.

MR. SEABURY: One moment, sir, I do not want any questions at all; I want to finish my remarks. I simply want to say that often questions of this kind which come from the Commercial Section and referred perhaps to the Council or the Finance Committee would probably receive no attention. I think the disposition has been for a long time to concede the Commercial Section to be the most important Section in the whole Association so far as creating ways and means and enlarging the area of this organization is con-

cerned. And that is all we want to use this money for, simply to increase its usefulness and spread its influence. And we want to know now whether we can spend this $200. We do not want to wait for the Council meeting to take place three or four months from now before we can go ahead. We want to go ahead right away. We have already got our work cut out Now, Mr. Hechler, you can ask all the questions you like.

MR. HECHLER: You have answered the question I was going to ask.

MR. HALLBERG: I move that it is the sense of the Association that the Finance Committee appropriate a sum not to exceed $200 for the use of the Commercial Section during the ensuing year, provided that the Finance Committee deem it advisable from the condition of the treasury.

Seconded and carried.

DR. DOHME: As per resolution passed in the Scientific Section, I move that we appropriate $20 to defray the expense of the Committee on Indicators which was provided last year and made a very lengthy and detailed report. The members of this Committee received no appropriation, and the Chairman of it was compelled go to an expense of $20 in the way of furnishing material.

MR. SEABURY: I second that motion, and move that it be referred to the Committee on Finance. (Laughter.)

DR. DOHME: I accept the amendment very gladly, and think that is the proper course.

The motion was then adopted.

Mr. Hallberg presented the following resolution from the Section on Legislation and Education in reference to the Metric System, and moved its adoption. Carried.

Resolved, That it is the sense of the American Pharmaceutical Association that the general adoption and use of the metric system of weights and measures in the United States is very desirable and would prove a great benefit to the people; that our trade relations with other nations would be stimulated by the unity of weights and measures, and that this Association will join hand in hand with the American Metrological Society and other societies in efforts to accomplish this unity; and,

Resolved, That the President of the American Pharmaceutical Association is hereby authorized and respectfully requested to appoint a committee, consisting of one member of each State Pharmaceutical Association, whose duty it shall be—

1. To work in conjunction with the American Metrological Society and other societies in petitioning Congress to pass a law that on and after July 1, 1896, the metric system of weights and measures, authorized by an Act of Congress approved July 28, 1866, shall be used exclusively in the Customs Service of the United States; and that on and after July 1, 1900, the use of the metric system of weights and measures shall be compulsory in the United States in all trades and transactions where weights or measures or both are used.

2. And to accelerate the passage of such law by Congress. it shall be the duty of each member of the Committee to communicate with one pharmacist in each congressional district in his State, and request him to endeavor to interest every pharmacist and other like-minded men in his district to sign the petition to Congress* and mail the same to his Representative.

* Form of the petition to be presented to Congress may be fouud attached to the paper on the Metric System, by R. A. Sauerhering among the minutes of the Section on Pharmaceutical Education and Legislation.—*The Secretary.*

It is further resolved, That each State Pharmaceutical Association is hereby requested to have the necessary number of petitions to Congress printed and sent to its member appointed as aforesaid, who will distribute the same as indicated above, as soon as convenient, and, if possible, in time that the next Congress at the next (the first) session may act on the same.

DR. STEWART: The following resolution is offered at the suggestion of several members:

WHEREAS, There is a concerted movement on the part of State and other representative pharmaceutical bodies to take into consideration national legislation referring to the drug business of this country, and as the American Pharmaceutical Association, being the national representative body, should take a leading position in such matters; therefore, be it

Resolved, That a Special Committee on National Legislation be appointed by the chair, to consist of three members, whose duty it shall be to formulate some plan to obtain united action in securing the repeal of such laws as are inimical to the best interests of the drug trade, and secure the passage of laws promoting the welfare of all concerned.

The resolution was adopted as read, and the Chair appointed as the committee provided for in the resolution Messrs. Stewart, Thompson and Ebert.

MR. REMINGTON: I have a resolution here which I think we will all agree to, and which can be adopted without taking up much time:

Resolved, That the American Pharmaceutical Association forward to the Secretary of the Treasury an earnest protest that if the Treasury Department succeed in establishing regulations which will make tax-free alcohol possible, that such regulations shall not be framed to exclude small manufacturers from participating in any advantages arising from the same.

Mr. Hechler moved the adoption of the resolution.
Seconded.

MR. GOOD: That is very far-reaching. I do not want to precipitate a discussion in the matter, but I understand it is a question that has been passed on before by the Association, and in the Commercial Section, practically, by reaffirming our position of a year ago. It means this, that the regulations which are passed must be such as can be accepted, that is what it means, must be accepted and utilized by all dealers, large or small. It is not possible for us to say what these regulations will be, but in all probability they will be placing a man in charge of your storehouse at a salary of $5 a day and $5 a night. Most likely these will be the regulations, and we cannot say that they do not apply to all dealers. They will not say they do not apply to all dealers, and when small dealers are asked to comply with a condition of that kind it will be an utter impossibility. We cannot say what the condition will be; we can only suggest the probability of the condition.

MR. SEABURY: I do not think that this organization ought to put itself on record on this subject in any such way, any more than the general way in which it was disposed of in the Commercial Section. We had a debate, and the mover of this resolution, I think, was the only one that was absent; but others took the same ground exactly, and they simply reaffirmed what we said on this subject last year for the simple reason that the government, while in a passable sort of way it has tried to do something with free alcohol, the fact remains that they have appropriated no funds nor methods for carrying it into execution. Therefore it is a useless expenditure of time to even pass a resolution asking

in such a broad and general way that free alcohol should be offered for the large or small manufacturers. The resolution confines it to no particular department. The great stress that was placed upon it in the Commercial Section was in its relation to medicine only. They were perfectly willing that it should be used in the arts and in the manufactures, perhaps, for export, but in no other way, and I do not think it is good policy for us to pass any such broad resolution as that. I move that it be laid on the table.

This motion was seconded by several.

MR. REMINGTON: I hope that the motion will be withdrawn just a few moments. The whole purport of this resolution is not at all as Prof. Good represents it, not in the least degree. It simply is this, and I do not believe that the American Pharmaceutical Association can afford to go before the pharmacists of this country and take any other stand—it simply says this: that the pharmacist who makes his tinctures and uses alcohol in his store, the retail druggist, shall have the same right as the manufacturer. It stands for the man who makes his own preparations in a small way, so that he shall not be wiped off the face of the earth: that is all that there is in it, and I do not believe that this American Pharmaceutical Association wants to go on record on any other basis. It is for the retail druggists of this country that these regulations are to be made—now it does not advocate the making of these regulations, it does not advocate tax-free alcohol; it simply says that if these regulations be made and they are left to the Secretary of the Treasury, that when they are made it shall be equal rights for all, the small as well as the large dealers.

MR. EBERT: I want to say that I fully agree with Mr. Remington that his resolution is in that condition, that no doubt the Secretary of the Treasury will give us that same privilege, provided we pay for it; but we cannot afford to pay $5 a night and $5 a day for the use of alcohol, and the wholesale manufacturer can afford to do it. If the Government, will say to us, "You shall have alcohol free without supervision of it," then we are in a condition to use it, but not under this condition.

MR. HALLBERG: I would like to inquire if the retail druggist is ready to become a bonded warehouse? That is what it amounts to. We know very well that it is impossible, and I defy the Secretary of the Treasury to pass any regulation providing for free alcohol for use in the ordinary retail drug store. That has been clearly shown and demonstrated all over the country, and therefore this means nothing except that it will give possibly an opportunity to provide regulations which are equal to everybody except with only secret preparations. Patent medicine men and large manufacturers could take advantage of it, and the retail druggist would pay the expense.

MR. HECHLER: The idea of having an inspector at your store or at your laboratory is all bosh. We are not distillers; we are not going to distill alcohol. We can have a gauger at any time free of charge. If we desire to use a certain amount of alcohol out of our barrel, the gauger will be there the same as he is at the wholesale house, and if we have to use 5 or 10 gallons, he will gauge it to us at that price.

Dr. Stewart raised the point of order that the motion to table a motion was not debatable, and called for the previous motion upon the tabling of the resolution. The motion prevailed.

The Secretary then read the report of the Transportation Committee as follows, which upon motion of Mr. Hallberg, was received, and the thanks of the Convention given to the Committee and the three gentlemen named, for their valuable services in connection with this work.

REPORT OF THE COMMITTEE ON TRANSPORTATION.

To the Council of the American Pharmaceutical Association:

Your Committee on Transportation take pleasure in reporting that they were successful in securing the lowest railroad rates ever regularly made for a convention in Denver, being one-half the regular fare. The limit on tickets was at first made requiring a return on or before August 25th. Your Committee succeeded subsequently in having the life of the tickets extended to September 1st, thus enabling those who desired to do so to feast for awhile upon the beauty and grandeur of Colorado.

Acknowledgment is here due to the valuable services rendered to this Committee by Mr. George Leis, of Lawrence, Kansas, Mr. R. J. Brown, of Leavenworth, and Mr. C. E. Corcoran, of Kansas City, and we recommend that a special vote of thanks be tendered these gentlemen by the Association.

Respectfully, CHAS. M. FORD, *Chairman.*

DENVER, COLO., *August* 16, 1895.

Mr. Thompson presented the following report of the delegation appointed to visit the American Medical Association.

Upon motion, the report was received and adopted.

REPORT OF THE DELEGATES TO THE AMERICAN MEDICAL ASSOCIATION.

To the American Pharmaceutical Association:

The Forty-sixth Annual Meeting of the American Medical Association was held in the city of Baltimore in the second week in May of this year.

Dr. Donald Maclean, of Detroit, President, presided.

The President's address opened with a succinct review of the rise and progress of medicine, after which he discussed the great need of higher education of the profession, and greater uniformity in the requirements of the schools of medicine for the same degrees. The importance of a National Bureau of Health was prominently set forth, and the President suggested that the Superintendent of this Bureau should be made a member of the Cabinet.

By a vote of the Association, your delegates were invited to seats on the floor, and were given the courtesies of the Association.

The question of inserting the advertisements of proprietary, or quack medicines in the "Journal of the American Medical Association," the official organ, was early brought before the meeting, and promised to occupy considerable of its time. Discussion was, however, postponed until the report of the Trustees in charge of the Journal should be made.

The report of the Trustees was that it has been ordered that hereafter "they would accept no advertisement of a medicinal preparation the proprietors of which do not give a formula containing the official or chemical names of each composing ingredient, to be inserted as part of the advertisement." This action of the Trustees met with unanimous approval.

A recommendation from the Section on Materia Medica and Pharmacy, that schools of medicine give their students more thorough instruction in the Metric System was adopted by the Association, as was also one from the American Pharmaceutical Association condemning the prescribing of proprietary medicines, and opposing all laws which were used to give them protection.

The Association by a large majority re-affirmed its recommendation to the schools of medicine to require a four years' course of all students for the degree of M. D.

The Section on Materia Medica and Pharmacy was presided over by Dr. Frank Woodbury.

Among the papers read before this Section was one by Prof. J. P. Remington, entitled "The Higher Education of Pharmacists."

The writer urged with his usual force the pressing need for the better instruction of the members of the Pharmaceutical profession, and contrasted the requirement of all Medical Boards that candidates for registration as physicians should present diplomas as M. D.'s. while no diploma is demanded by any Board of Pharmacy in this country of those who desire to be registered as Pharmacists.

In the discussion of this paper it transpired that the Philadelphia College of Pharmacy had after many years of opposition finally decided to confer the degree of Doctor of Pharmacy on students hereafter entering the college who shall have had four years' practical experience. To those lacking that experience the degree Pharmaceutical Chemist will be given. A three years' course will be required for either degree.

A paper by Dr. F. E. Stewart of New York, on the active principles of Cod Liver Oil, was read by the doctor, who also presented specimen results of some of his efforts to separate what he considers the active constitutents of this remedy from the fatty portion. The writer claimed that the nutrient effect of the oil should rather be attributed to the stimulation of the digestive function by these constituents which he had endeavored to isolate, rather than to the fat of the oil.

Mr. Henry P. Hynson, of Baltimore, presented and read a paper entitled "The Study of Pharmacy in Medical Schools."

The Section voted to ask the Association to add Therapeutics to this Section, which request was concurred in by the Association.

Dr. R. Beverly Cole, of San Francisco, was elected President for the ensuing year, and Dr. W. B. Atkinson, of Philadelphia, was re-elected Secretary for the thirty-second time.

The next meeting of the Association is to be held at Atlanta, Georgia, on the second Tuesday in May, 1896.

Respectfully submitted, W. S. Thompson,

August 14, 1895. *Chairman.*

Dr. Dohme read the report of the Committee on Observation Sheet, which, upon motion, was received and adopted, reading as follows;

REPORT OF THE WORK DONE IN CONNECTION WITH THE OBSERVATION SHEET.

The report of the Chairman of the Scientific Section as promulgator of the observation sheet idea, originated and proposed by our ex-President, Mr. E. L. Patch, at Asheville, N. C., last year, is very brief, although it was hoped and expected that it would be very long.

It remains for him merely to outline how the work was carried on. After being submitted to Mr. Patch for approval, five thousand observation sheets were printed, and the same number of explanatory circulars, and sent to every member of this Association with the annual volume of the Proceedings. Besides this, the full sheet and circulars were twice printed in full in a dozen or more of our leading pharmaceutical journals in this country and Canada. Attention was also called to their purpose, and to the time to hand them in, in all the journals. A supply of several hundred with addressed envelopes was likewise sent to prominent pharmacists in all sections of this country, from Maine to Texas and New York to California, together with a personal letter to each.

The editors of all the pharmaceutical journals were kind enough to favor this Association and help this work along, and each was supplied with a hundred or more of sheets and explanatory circulars, and from many of them were received letters stating that all

or almost all of the sheets and circulars had been distributed in sections and into hands where they would most likely meet with favorable consideration.

There remain about 1000 sheets and circulars, thus showing that about 4000 have been distributed. Some inquiries were received from various parts of this country and Mexico for these sheets as a result of the notices in the journals, and I have no doubt many were distributed by the editors of the journals already mentioned themselves.

In reply to the 4000 sheets distributed, there were received by your Chairman of the Scientific Section nineteen inquiries for observation sheets, representing fourteen States, and one from Mexico. Replies have been received from seven gentlemen of the nineteen applicants, and these are submitted for your consideration.

On the day before leaving for this city, Mr. Patch sent in a very elaborately worked-out account of the reports of nineteen gentlemen personally acquainted with him from all sections of this country. This embraces about 50,000 prescriptions, and was presented in the Scientific Section.

It may be possible by personal solicitation to induce pharmacists to take up this important and valuable piece of work; but it covers so long a time—about six months—that most pharmacists apparently forget all about it before the time arrives for sending in their replies and votes.

It may be desirable to point out at this time again the value and importance of these observation sheets.

Advance in general is the result of the workings of thought upon observation.

These sheets are intended to furnish the observations to the pharmacist and induce him to let his thoughts play upon them, and thereby make an advance in our science. When a goodly per cent. of pharmacists make many or few observations of the troubles and scientific as well as practical problems that confront them in their work in the pharmacy, and give the result of their thought and experience in solving them, much good must result to the science of pharmacy and to the work and practice of the pharmacist in his business.

If we could get two thousand pharmacists to jot down their experiences in solving the knotty questions that come up regularly in the course of their work, it does not take much deliberation to arrive at the conclusion that many valuable facts would be brought to light, and many a moment saved that might otherwise be spent in solving these same problems. Let me express the hope that many pharmacists will during the next year realize that this is valuable work both to their science and their individual pharmacy, and will give us the benefit of their observations and deliberations.

All that can be said here is that up to the present the plan is not successful, and interest cannot be aroused in it. To judge by the number of enthusiastic letters received, the outlook last autumn and this spring was very encouraging, but it appears that the enthusiasm spent itself in good intentions. At any rate, for a beginning it is a failure, though it is sincerely to be hoped that it may be possible to make it a success by persistent effort.

Respectfully submitted, ALFRED R. L. DOHME.

Mr. Sheppard moved that the Local Secretary be made Chairman of the Committee on Arrangements, with authority to appoint an associate. Seconded and carried.

Mr. Sheppard moved that the Special Committee on the National Formulary and Auxiliary Committee on Membership be continued for the next year, and that the President-elect appoint the members thereof. Seconded and carried.

The Secretary read the following communication from the Section on

Materia Medica, Pharmacy and Therapeutics of the American Medical Association.

American Pharmaceutical Association: The following list of queries will form part of the official programme of the Section on Materia Medica, Pharmacy and Therapeutics of the American Medical Association next year. They are queries of much importance, and should be thoroughly discussed by both physicians and pharmacists. As it is a custom for the American Pharmaceutical Association to send a delegation to our Section who take active part in its deliberations, I consider the queries of sufficient importance to present to you at this meeting, so your delegation may have time to give them careful consideration during the interval which will elapse between the meetings of the two Associations. Short, pithy papers of twenty minutes' duration, and five minutes' discussion would be very acceptable and interesting, and we hope that several such papers may be donated by the members of your delegation.

F. E. STEWART, M. D., PH. G.

Chairman of Section on Materia Medica, Pharmacy and Therapeutics, of the American Medical Association.

ON THE RELATIONS OF PHYSICIANS AND PHARMACISTS TO EACH OTHER AND TO THE PUBLIC AT LARGE.

QUERIES.

1. Should any medicine possessing active physiological properties or that is capable of exerting toxic effects ever be dispensed without being authorized or prescribed by a physician? If so, state under what circumstances?

2. Should the manufacture, dispensing, and sale of medicine be restricted to pharmacists?

3. Should physicians dispense their own medicine? If so, when?

4. Should pharmacists prescribe over the counter? If so, when?

5. Is the use of the tablet triturate to be commended by physicians? If so, to what extent?

6. Should medical journals publish advertisements of secret proprietary medicines?

7. Should medical journals advertise medicines whose working formulas and composition are not published?

8. Should medicines ever be advertised to the laity? If not, how can it be prevented?

9. Should the formulas of proprietary medicines be printed on the labels?

10. What is the responsibility of editors and publishers in the matter of advertisements? *Fame*, an organ of the advertising trade, says, in the August number of 1892, page 176, that "journals admitting advertisements of frauds are in partnership with thieves."

11. The German government publishes the analysis and true composition of secret medicines in the daily papers, under the head of "Police Intelligence." Is the plan to be recommended for adoption in this country?

12. It is said that, by substituting their own preparations in physicians' prescriptions, pharmacists are attempting to kill the proprietary medicine business? Is this justifiable?

13. Should physicians prescribe medicines restrained from general use by secret formula, patents, copyrights, or trademarks?

14. The demand for many proprietary medicines has been created by physicians' prescriptions. Should honorable pharmacists refuse to deal in such patent medicines, when this is the case?

15. Is pharmacy a liberal profession, or a trade?

16. Is the practice of medicine a liberal profession or a trade?

17. Should prescriptions be renewed indefinitely without orders from physicians? If not, how can pharmacists avoid doing so, if requested by their patrons?

18. Physicians' supply houses and general apartment stores appear to be encroaching upon the business of the apothecary. Is this detrimental to the interests of the profession or the public? If so, can it be remedied?

19. Should the fact that a remedy is restrained from general use by patents, trademarks, copy-rights, or secret formulas, prevent its admission into the United States Pharmacopœia?

20. Should the pharmacist graduate from a Medical College, and practice pharmacy as a specialty in medicine, like dermatology, ophthalmology, etc., etc.?

21. Of what use is the United States Pharmacopœia?

22. Of what use is the National Formulary?

Upon motion of Mr. Hallberg, this communication was referred to the Delegation to visit the American Medical Association.

The Secretary also read communications from the Atchison Retail Druggists' Association, and the Chicago Retail Druggists' Association, relative to tax-free alcohol and the prices of proprietary medicines, which on motion of Mr. Hallberg were referred to the Section on Commercial Interests.

The following resolution having been received from the Nebraska State Pharmaceutical Association, was read by the Secretary, and upon motion of Mr. Ebert referred to the Special Committee on National Legislation:

Resolved, "That the delegates to the American Pharmaceutical Association be instructed to request that Association to organize an effort to prevail upon the Representatives and Senators to pass such laws as will change the present rules and regulations in regard to medicinal copyrighted and trade-marked preparations, which are fixed so that the American public are a prey for the whole world—Germany wrongfullly taking millions out of this country without return." W. L. Heilman,

Secretary Nebraska State Pharmaceutical Association.

The Secretary further read a communication from the American Library Association, as follows:

Acting Secretary's Office, Denver, Col., 15 *August*, 1895.

At a meeting of this Association held this day, it was unanimously voted:

That the American Library Association extend cordial greetings to the American Pharmaceutical Association, with congratulations on the pleasant auspices under which we are both holding our meetings in Denver at the same time.

C. Alex. Nelson,
Acting Secretary.

Mr. Hallberg moved that the Secretary, under the direction of the Council, be requested to mail a copy of the preliminary report of the Proceedings as soon as issued to every chairman of a Standing Committee.

Seconded by Mr. Sheppard and adopted.

Mr. Sheppard moved that a committee of five be appointed by the new President to represent the American Pharmaceutical Association at the meeting of the National Wholesale Druggists' and Proprietors' Association

to be held in Denver, September 2, and that the members be selected from Denver and near by.

Seconded and adopted.

The following members were appointed as such Committee: Messrs. Chas. M. Ford, of Denver; W. J. M. Gordon, of Cincinnati, Ohio; Chas. E. Ward, of Denver; W. S. Thompson, of Washington, D. C., and E. L. Sholtz, of Denver.

Upon motion of Dr. Whelpley, the reading of the minutes of this meeting was dispensed with, and the Convention thereupon proceeded to the installation of new officers.

Mr. Sheppard moved that the President be formally installed, and that the formal installation of the other officers be dispensed with.

Seconded and carried.

The President appointed Messrs. Remington and Ebert to conduct the newly-elected President to the chair, and as President Simpson pinned the badge of office upon President-elect Good, he said:

"It is with sincere pleasure that I present to you the badge of your office as President of the American Pharmaceutical Association. I am sure you will wear it with pleasure to yourself and honor to the Association."

PRESIDENT GOOD: Mr. President and Members of the Association, I have thought that I would like to make you a nice little speech, because of the honor which you have conferred upon me, but the hour is late and we are all tired. I deem it an honor I assure you and I shall try to bear myself in the position in such a way that I will not discredit the many illustrious predecessars that I have had; many of them you bear in mind. I have been fully impressed with the number of ex-Presidents that we have had present at this meeting, and I will call your attention to them by name, hoping that I have not omitted to note all, and I give them about as it occurs to me in the order in which they have been Presidents of this Association. They are Gordon, Ebert, Diehl, Thompson, Lloyd, Alexander and Remington. We trust that they may live a long time to add dignity and honor to our proceedings.

The objects of this Association which meets now in its forty-third annual meeting are well known to all of you. We hope you will succeed in coming years in keeping it up to the full standard that it has reached in this time. We do not all come here for the same motives, but none come with any but the purest and best of motives, and the objects to be gained by thus conferring together are good and far-reaching. We feel under very many obligations I am sure to our Denver friends, the ladies and gentlemen who have devoted themselves to us. I speak of this knowing that there will be a vote of thanks extended to them, but to make another point, knowing that they have neglected their domestic affairs and business to devote themselves to our pleasure and the interest of this Association at this time. In the list of the objects which we have in meeting around in different sections of the country, or in the list of the good which comes from these meetings are the new friends with whom we make lasting friendships. We are starting out with a new year in the history of the Association, and I hope you will resolve here and now to do something for the Association to advance its interests during the coming year, and also to be present at the next annual meeting, which will be held in Montreal, in August, 1896. I thank you sincerely, and will not detain you any longer, as the hour is late. (Applause.)

PRESIDENT SIMPSON: I surrender to your hand the gavel which controls this Assembly, and I hope you will have as much pleasure in the exercise of the duties of the office as I have had in the past year, and I know you will meet with the unanimous courtesy that I have met with at the hands of the individual members. (Applause.)

THE PRESIDENT: By motion you have concluded not to regularly install the other officers, but I will ask the Secretary to read the names of these officers, however, and we will consider them from this period the officers of the Association.

The Secretary then read the names of the newly-elected officers of the Association, which were received with applause as read.

MR. HALLBERG: If necessary, I desire to move for a re-consideration of the motion relative to the installment of the other officers, for the purpose of presenting one of the vice-presidents who has just arrived in the room.

The motion was seconded and unanimously carried, and the Committee escorted to the platform Mrs. M. O. Miner, Third Vice-President of the Association, who upon being introduced, addressed the Convention as follows:

Mr. President, Ladies and Gentlemen: I am mindful of the honor that you have paid me. I receive it not so much for myself, as a tribute you pay to woman in pharmacy. For the great American Pharmaceutical Association to admit to its ranks—no matter how low the grade of office may be—a woman, is surely a tribute to woman in pharmacy. For this I thank you. (Applause.)

MR. SHEPPARD: I am very glad, indeed, that we reconsidered our motion to that extent, and I will say here that it was pure thoughtlessness on my part that I made the motion before. I now renew the motion that we do not go any further in the formal installation of officers, but that we consider that action as taken.

Seconded and adopted.

The President announced the following Committees:

Committee on Association Prizes.—Messrs. E. L. Patch, Chas. Rice, and Geo. B. Kauffman.

Committee on Revision of the United States Pharmacopœia.—Messrs. Leo Eliel, A. B. Stevens, E. H. Bartley, Wm. M. Searby and A. R. L. Dohme.

Committee on National Formulary.—Messrs. C. Lewis Diehl, C. S. N. Hallberg, G. H. Chas. Klie, C. T. P. Fennel and Adam Conrath.

The President stated that the Committee to attend the Section on Materia Medica and Pharmacy of the American Medical Association would be announced later.

Mr. Sheppard offered the following resolution, which, upon motion of Mr. Watson, was carried by a unanimous rising vote:

Resolved, That the members of the American Pharmaceutical Association tender a vote of thanks to the members of the Local Entertainment Committee, the ladies of Denver, and the retiring officers of the Association.

Upon motion of Mr. Fennel, amended by Mr. Thompson, a Committee

was appointed to prepare a vote of thanks to be adopted by the Association and put in the morning papers of Denver, directed to the local members, the Chamber of Commerce of Denver, the proprietor of the Brown Palace Hotel, the druggists of the State of Colorado and citizens of Denver, the Governor of Colorado, the Mayor of Denver and the railroad officials, the organist and lady pianist at the organ recital of the preceding evening.

The President appointed as such Committee Messrs. Thompson, Dohme and Barnum, who prepared resolutions of thanks, and secured the publication of the same in the Denver papers.

There being no further business to come before the Association, adjournment was had at 12:45 a. m., to meet at Montreal on the 12th day of August, 1896.

ALPHABETICAL LIST OF NAMES OF MEMBERS FROM WHOM MONEY HAS BEEN RECEIVED BY THE TREASURER FOR ANNUAL DUES OR CERTIFICATES, FROM JULY 1, 1894, TO JULY 1, 1895.

	Annual Dues.	Certificates.
Adamick, Gustave H. ....'94–'95	$10 00	
Aimar, Charles P.....'94	5 00	
Aird, William .....'94–'95	10 00	
Albright, Emmet C.....'94	5 00	
Alexander, Maurice W.....'94	5 00	
Allen, E. Floyd.....'94	5 00	
Alpers, William C.....'94–'95	10 00	
Amend, Bernard G.....'95	5 00	
Anderson, James M.....'94	5 00	
Andrews, Josiah H.....'94	5 00	
Andriessen, Hugo.....'95	5 00	
Angell, Richard.....'94	5 00	
Apel, Frederick E.....'94	5 00	
Apple, Franklin M.....'94	5 00	
Argenti, Jerome J. B.....'94	5 00	
Armar, Alpheus.....'94	5 00	
Arny, Harry V.....'95	5 00	
Arrington, Homer H.....'94	5 00	
Aspinall, Walter A... ...'93–'94	10 00	
Aubley, Samuel.....'94	5 00	
Averill, William H.....'94	5 00	
Ayer, Charles F.....'94	5 00	
Baird, Julian W.....'94–'95	10 00	
Baker, Edwin.....'95	5 00	
Baker, T. Roberts.....'95	5 00	
Ballard, John W.....'94–'95	10 00	
Baker, Gustavus.....'95	5 00	
Baltzley, Zachariah T.....'94–'95	10 00	
Baridon, Louis R.....'95	5 00	
Baril, Joseph B.....'94	5 00	
Bartells, George C.....'94	5 00	
Bartlet, William W.....'92	5 00	
Bartley, Elias H.....'94–'95	10 00	
Bassett, Charles H.....'92	5 00	
Bauer, David S.....'94	5 00	
Baur, Jacob .....'94	5 00	
Baylis, Lewis F.....'95	5 00	
Bayly, Charles A.....'94	5 00	
Beach, Clifton H.....'94	5 00	
Beal, James H.....'95	5 00	
Beardmore, William A.....'94	5 00	
Beasley, William A.....'94	5 00	
Bechberger, Henry .....'94–'95	10 00	
Bechmann, Charles R.....'94	5 00	
Becker, Charles L.....'95	5 00	
Behrens, Em'l C. L.....'94–'95	10 00	
Behrens, Paul J.....'94	5 00	
Beiteman, William W .....'95	5 00	
Bell, S. Howard.....'95	5 00	
Belt, Z. James.....'94–'95	10 00	
Bendiner, Samuel J.....'95	5 00	
Benfield, Charles W.....'94–'95	10 00	
Benhard, Albert H.....'94	5 00	
Benton, Wilber M.....'94	5 00	
Beringer, George M.....'94–'95	10 00	
Berryhill, Henry P.....'95	5 00	
Best, John.....'94	5 00	
Betzler, Jacob .....'94	5 00	
Beyschlag, Charles.....'95	5 00	
Biddle, Herbert G.....'95	5 00	
Amount carried forward.....	$365 00	

	Annual Dues.	Certificates.
Amount brought forward.....	$365 00	
Billings, Henry M.....'95	5 00	
Bingham, Charles C..... '94–'95	10 00	
Bishop, Samuel E.....'94	5 00	
Black, John R.....'95	5 00	
Blackman, Augustus S.....'94	5 00	$5 00
Blaikie, William.....'94–'95	10 00	
Blair, Henry C.....'95	5 00	
Blake, James E.....'95	5 00	
Blanding, William O.....'94–'95	10 00	
Blank, Alois.....'94	5 00	
Blestren, Hans M. G.....'94–'95	10 00	
Bley, Alphonso A. W.....'94–'95	10 00	
Blumauer, Louis..... .....'94	5 00	
Bobbitt, James H.....'94	5 00	
Bocking, Edmund.....'94	5 00	
Boehm, Solomon .....'93–'94	10 00	
Borell, Henry A.....'94	5 00	
Boyce, Samuel F.....'94	5 00	
Boyce, Samuel R.....'94–'95	10 00	
Boyd, George W .....'95	5 00	
Boyden, Edward C.....'95	5 00	
Boyden, Henry D.....'94	5 00	
Brack, Charles E.....'94	5 00	
Bradley, Augustus .....'94	5 00	
Bradley, Charles L.....'94	5 00	5 00
Brand, Erich .....'94	5 00	
Brandenberger, Adolph.....'94	5 00	
Braun, Adolf .....'94	5 00	
Braunwarth, Alice L.....'95	5 00	
Barningstall, Reuben G.....'94	5 00	
Brewer, John W.....'94	5 00	
Briggs, Andrew G..... .....'95	5 00	
Brisley, Harry.....'94	5 00	
Brooks, Claude M.....'94	5 00	
Brooks, Frederic P..... .'94	5 00	
Brooks, George W.....'94–'95	10 00	
Brother, William.....'95	5 00	
Brown, Albert E.....'93–'94	10 00	
Brown, William A.....'94	5 00	
Brown, William T.....'94	5 00	
Bruck, Philip H.....'95	5 00	
Bruguier, Francis.....'94	5 00	
Brundage, Albert H.....'94	5 00	
Brunner, Norman I.....'93–'94	10 00	
Buchheit, Augustus W....'94–'95	10 00	
Bunker, Elihu .....'95	5 00	
Burgheim, Jacob .....'94	5 00	
Burnham, Alfred A., Jr.....'95	5 00	
Burns, J. Kellar.....'94	5 00	
Burrough, Horace .....'95	5 00	
Butler, Charles H.....'95	5 00	
Button, Charles E.....'95	5 00	
Byrne, John.....'94–'95	10 00	
Calder, Albert L.....'95	5 00	
Calvert, John .....'94	5 00	
Candidus, Philip C.....'94	5 00	
Carr, Will L.....'94	5 00	
Carrell, Eugene A.....'94	5 00	
Carter, Frank H .....'94	5 00	
Amount carried forward.....	$720 00	$10 00

	Annual Dues.	Certificates.
Amouut brought forward.....	$720 00	$10 00
Carver, Frank H.....'95	5 00	
Case, Charles H.....'94	5 00	
Caspari, Charles, Jr.....'95	5 00	
Casper, Thomas J.....'95	5 00	
Cates, William E.....'92–'93–'94	15 00	
Catlin, Ephron.....'94	5 00	
Chandler, Charles F.....'95	5 00	
Chapin, Fred. H.....'94	5 00	
Chapin, William A.....'95	5 00	
Chapman, Isaac C.....'95	5 00	
Charropin, Emil L.....'95	5 00	
Cheatham, Thomas A.....'94	5 00	
Christian, John F.....'94	5 00	
Christiani, Charles.....'95	5 00	
Christie, James .....'94	5 00	
Church, Merton E.....'94	5 00	
Clark, John A .....'94	5 00	
Clarke, Louis G .....'94	5 00	
Cobb, Ralph L .. ..'95	5 00	
Coblentz, Joe. Dan..... ...'94	5 00	
Coblentz, Virgil.....'94	5 00	
Cole, Howson W.....'95	5 00	
Cole, Victor L.....'94–'95	10 00	
Colen, James A.....'95	5 00	
Colgan, John .....'94	5 00	
Collins, Albert B.....'95	5 00	
Conger, Iliff.....'93–'94	10 00	
Conrath, Adam .....'95	5 00	
Constantine, Edward R.....'94	5 00	
Cook, Thomas P.....'94–'95	10 00	
Coon, James V. D.....'94	5 00	
Copeland, Sidney F.....'94–'95	10 00	
Cornell, Edward A.....'94	5 00	
Cornell, Russell W.....'94–'95	10 00	
Cotton, William H.....'94	5 00	
Coupe, Robert E.....'94	5 00	
Cowdin, George H.....'94	5 00	
Cox, John T.....'94	5 00	
Cox, William A.....'94–'95	10 00	7 50
Crady, Edward E.....'94–'95	10 00	
Cramer, Max.....'95	5 00	
Crane, Frank T .....'94–'95	10 00	7 50
Crawford, Walter B., Jr .....'95	5 00	
Criswell, Francis M.....'95	5 00	
Cronheim, Solomon .....'94	5 00	
Croom, James D.....'94	5 00	
Crowdle, John E.....'94	5 00	
Culbreth, David M. R....'94–'95	10 00	
Culver, Anson A.....'95	5 00	
Cunningham, Mrs. Henrietta M.'94	5 00	
Currier, Edward H.....'94	5 00	
Curry, David W.....'94	5 00	
Cuthbert, Richard W.....'94–'95	10 00	
Cutts, Foxwell C., Jr.....'95	5 00	
Danforth, Edmund C.....'93–'94	10 00	
Dare, Charles F.....'94–'95	10 00	
Dashiell, Robert M.....'94	5 00	
Danbach, Charles J.....'94	5 00	
Davies, Llewellyn P.....'95	5 00	
D'Avignon, J. Eugene.....'94	5 00	
Davis, George R.....'94	5 00	
Davis, John A.....'94	5 00	
Davis, Theodore G.....'95	5 00	
Dawson, Edward S., Jr.....'94	5 00	
Dawson, John H.....'94	5 00	
De Forest, William P.....'94	5 00	
De Lorenzi, Albert.....'94	5 00	
Diebert, Thomas I. .....'94	5 00	
Dejan, George .....'95	5 00	
Delouest, Edward.....'94	5 00	
Dennin, Charles.....'95	5 00	
Dennin, Edwin C.....'95	5 00	
Depeyre, Louis N.....'94	5 00	
Devine, John .....'94	5 00	
Diehl, C. Lewis..... ....'94	5 00	
Amount carried forward.....	$1165 00	$25 00

	Annual Dues.	Certificates.
Amount brought forwaad.....	$1165 00	$25 00
Dilly, Oscar C.....'94	5 00	
Dimock, Robert H.....'95	5 00	
Dixon, John M.....'94–'95	10 00	
Dixson, Frederick H.....'94	5 00	
Dobbins, Edward T.....'94	5 00	
Dohme, Alfred R. L.....'94	5 00	
Dohme, Charles E.... .....'94	5 00	
Dohme, Louis .....'94	5 00	
Dorner, Emil A.....'95	5 00	
Dougherty, Samuel E .....'94	5 00	
Douglass, Henry, Jr. .....'94	5 00	
Dowdy, Joseph F.....'94	5 00	
Downing, Benjamin F....'94–'95	10 00	
Downing, Lucien B.....'95	5 00	
Drake, Frederick T .....'94	5 00	
Drake, John R.....'95	5 00	
Dresser, George E.....'94	5 00	
Druehl, Frank A.....'94	5 00	
Drury, John S... .....'94	5 00	
Duble, Jesse B.....'94	5 00	
DuBois, William L.....'94–'95	10 00	
Duckett, Walter G.....'94–'95	10 00	
Duggan, James.....'94–'95	10 00	7 50
Dunham, Henry B.....'94	5 00	
Dunn, John A.....'95	5 00	
Dunwody, Richard G .....'94	5 00	
Dupont, William.....'94	5 00	
Durban, Sebastian C.....'94	5 00	
Durkee, William C.....'95	5 00	
Eagney, James T.....'94–'95	10 00	
Earl, Noble C.....'94	5 00	
Easterday, Herbert C.....'94–'95	10 00	
Eberbach, Ottman. ....'95	5 00	
Eccles, Robert G.....'95	5 00	
Eddy, Henry C.....'94	5 00	
Edwards, Frederick B.....'94	5 00	
Eggers, Frederick H.....'94–'95	10 00	
Ehrlicher, Henry M.....'94	5 00	
Eichrodt, Charles W .....'94	5 00	
Ekman, N. Adolf.....'94–'95	10 00	
Eliel, Leo.....'94	5 00	
Elliott, Arthur H.....'94–'95	10 00	
Elliott, Henry A.....'95	5 00	
Elliott, Sydney T .....'94	5 00	
Emanuel, Louis.....'95	5 00	
Emerson, Hermann L.....'94	5 00	
Emich, Columbus V.....'95	5 00	
England, Joseph W.....'94	5 00	
Ernst, Frank F. .....'94	5 00	
Eschman, Clemens L.....'94–'95	10 00	
Eschmann, F. W. R.....'93–'94	10 00	
Estes, Joseph J.....'94–'95	10 00	
Evans, Joseph S.....'95	5 00	
Ewing, Frederic C.....'94	5 00	
Ewing, John.....'94	5 00	
Eyssell, George.....'93–'94	10 00	
Fairchild, Benjamin T.....'94	5 00	
Fairchild, Samuel W.....'95	5 00	
Farrar, Samuel R.....'94	5 00	
Feil, Joseph .....'92–'93–'94	15 00	
Fennel, Charles T. P.....'95	5 00	
Fetger, Nevin D... .....'94	5 00	
Fieber, Gustavus A.....'94	5 00	
Field, Claud.....'94	5 00	
Field, James C.....'94	5 00	
Fink, Frederick Wm.....'95	5 00	
Finlay, Alexander K.....'94	5 00	
Finn, Thomas.....'94	5 00	
Firmin, John C.....'94	5 00	
Fischer, Oscar F.....'94	5 00	
Fish, Charles F.....'94	5 00	
Fisher, Elbert E.....'94–'95	10 00	
Fisher, George W.....'94–'95	10 00	
Flanagan, Lewis C.....'95	5 00	
Fleck, Jacob J.....'93	5 00	
Amount carried forward.....	$1630 00	$32 50

	Annual Dues.	Certificates.
Amount brought forward.....	$1630 00	$32 50
Fletcher, John W.....'94–'95	10 00	
Flint, George B.....'94–'95	10 00	
Flood, William H.....'93	5 00	
Ford, Charles M.....'94–'95	10 00	
Forsyth, William K.....'94	5 00	
Foster, J. Webb.....'94	5 00	
Fowler, Joseph W.....'94	5 00	
Fox, Peter P.....'94	5 00	
Frames, J. Fuller .....'94	5 00	
Franken, James L.....'94	5 00	
Fraser, Horatio N.....'95	5 00	
Frauer, Herman E.....'94	5 00	
Freeman,, William B.....'94	5 00	
French, John I.....'94	5 00	
Frohwein, Richard .....'94	5 00	
Frye, George C.....'95	5 00	
Furl, Irwin W.....'94	5 00	
Gallagher, John C.....'94	5 00	
Gammon, Irving P..... .....'94	5 00	
Gano, William H.....'94	5 00	
Gates, Howard E.....'95	5 00	
Gans, Charles H.....'94	5 00	
Gayle, John W.....'95	5 00	
Gee, Charlie.....'94–'95	10 00	
Gegelein, Frederick L.....'95	5 00	
Geiger, Charles F.....'94	5 00	
Geisler, Joseph F.....'94	5 00	
George, Charles T..... . ..'94	5 00	
Gessner, Emil A.....'95	5 00	
Gilbert, Charles A.....'94–'95	10 00	
Gill, George.....'95	5 00	
Gilpin, Henry B.....'95	5 00	
Girling, Robert N.....'95	5 00	
Gleim, John C.....'94–'95	10 00	
Glover, William H.....'94	5 00	
Godbold, Fabius C.....'94–'95	10 00	
Godding, John G.....'95	5 00	
Good, James M.....'94	5 00	
Goodale, Harvey G.....'94	5 00	
Gooding, Chas. J.....'94	5 00	
Goodman, Chas. F.....'94	5 00	
Goodman, Lester H.....'94	5 00	
Gorgas, George A.....'95	5 00	
Gosman, Adam J.....'95	5 00	
Grambois, Augustin.....'94–'95	10 00	
Grandjean, Eugene .....'94	5 00	
Graner, William .....'94	5 00	
Grassly, Charles W.....'94	5 00	
Gray, Henry R.....'94	5 00	
Green, Benjamin.....'94–'95	10 00	
Greiner, William E.....'95	5 00	
Greve, Theodore L. A.....'95	5 00	
Greyer, Julius .....'94	5 00	
Grosklaus, John F.....'95	5 00	
Grosvenor, Daniel P.....'94	5 00	
Gundrum, George.....'94	5 00	
Haake, William H.....'94–'95	10 00	
Habliston, Charles C.....'94	5 00	
Hadley, Frank R.....'95	5 00	
Haight, William B.....'95	5 00	
Hall, Charles K.....'95	5 00	
Hall, Edwin B.....'95	5 00	
Hall, Marshall C.....'94	5 00	
Hall, Nettie C.....'94	5 00	
Hall, William A.....'94	5 00	
Hallberg, Carl S. N.....'94–'95	10 00	
Hamilton, Claude C.. .....'94	5 00	
Hance, Edward H.....'94	5 00	
Hancock, Charles W.....'94	5 00	
Hancock, Franklin W.....'93	5 00	
Hanenkratt, Diebold V.....'94	5 00	*$7 50
Hardigg, William L.....'94	5 00	
Harding, Lawrence A.....'94	5 90	
Hardison, James A.....'94	5 00	
Hardy, Cyrus D.....'94	5 00	
Amount carried forward.....	$2060 00	$40 00

	Annual Dues.	Certificates.
Amount brought forward.....	$2060 00	$40 00
Hargrave, Benj. W,.....'94	5 00	
Harlow, Noah S... .....'95	5 00	
Harrington, Frank.....'94	5 00	
Harris, Francis M.....'94	5 00	
Harrison, Jacob H.....'94	5 00	
Hart, Gilbreath N.....'94	5 00	
Harter, Isaac F.....'94–'95	10 00	
Hartnett, Eugene.....'94	5 00	
Hartshorn, Frederick A.....'95	5 00	
Hartwig, Charles F.....'94	5 00	
Hartwig, Otto J.....'95	5 00	
Harvey, John M.....'94	5 00	
Hassebrock, Henry F.....'94	5 00	
Hassinger, Samuel E. R.....'94	5 00	
Hattenhauer, Robert C.....'94	5 00	
Hatton, Ellmore W.....'94–'95	10 00	
Hawkins, M. Smith.....'95	5 00	
Hay, Edward A.....'95	5 00	
Hayes, Horace P.....'95	5 00	
Hayes, James H.....'94–'95–'96	15 00	
Haynes, David O..... ..'95	5 00	
Hays, Joseph A.....'93–'94	10 00	5 00
Hechler, George L.....'94–'95	10 00	
Heddens, Claus H.....'94–'95	10 00	
Heebner, Charles F.....'94–'95	10 00	
Hegeman, J. Nevin .....'95	5 00	
Heinemann, Otto.....'94–'95	10 00	
Helfman, Joseph.....'94	5 00	
Helke, William L.....'95	5 00	
Heller, George G.....'94	5 00	
Hemm, Francis.....'94	5 00	
Hemm, Louis P.....'94–'95	10 00	
Henderson, Archibald K.....'95	5 00	
Henry, Charles.. .....'94	5 00	
Henry, Charles L.....'94	5 00	
Henry, Frank C.....'94–'95	10 00	
Hepburn, John.....'94	5 00	
Hereth, Samuel F.....'94	5 00	
Hervey, James.....'95	5 00	
Hess, Paul L.....'94	5 00	
Hettinger, Howard H.....'94	5 00	
Heydenreich, Emile.....'95	5 00	
Heyerdahl, Carl Otto.....'94	5 00	
Hickerson, William H....'94–'95	10 00	7 50
Higby, William H.....'94–'95	10 00	
Higgins, James L.....'95	5 00	
Hille, David J.....'94	5 00	
Hillebert, George A.....'94	5 00	5 00
Hilton, Samuel L.....'95	5 00	
Hiriat, Sebastian.....'95	5 00	
Hitchcock, John E.....'94	5 00	
Hobbs, William .....'94	5 00	
Hoffman, Julius.....'94–'95	10 00	
Hoffman, Frederick .....'95	5 00	
Hogan, John J.....'94	5 00	
Hohly, Charles.....'94	5 00	
Holland, George.....'94	5 00	
Hollister, Albert H.....'94	5 00	
Holmes, Clay W.....'95	5 00	
Holzhauer, Gustavus.....'94	5 00	
Hopp, Lewis C.....'94	5 00	
Horn, Wilbur F.....'94–'95	10 00	
Houghton, Harry J.....'94	5 00	
Howson, Arthur B.....'94	5 00	
Hoyt, George M.....'94–'95	10 00	
Hubert, Ernest.....'94–'95	10 00	
Huder, Henry J.....'94	5 00	
Hudson, Arthur.....'95	5 00	
Hduson, T. F.....'94	5 00	
Huested, Alfred B.....'94	5 00	
Hunter, Buxton W.....'94	5 00	
Hunter, Henry B.....'94	5 00	
Huntington, William H.....'95	5 00	
Hurd, John C.....'95	5 00	
Hurty John, N.....'94	5 00	
Amount carried forward.....	$2520 00	$57 50

	Annual Dues.	Certificates.
Amount brought forward.....	$2520 00	$57 50
Huston, Charles .....'95	5 00	
Hutchins, Isaiah .....'94–'95	10 00	
Hutton, Harry D. ....'95	5 00	
Hydron, Carl .....'94–'95	10 00	
Hynson, Henry P.....'94	5 00	
Illsley, George W. B. .....'94	5 00	
Ingalls, John .....'94	5 00	
Ink, Charles E.....'94	5 00	
Irvin, William A.....'95	5 00	
Jacobs, Joseph ..... .'94–'95	10 00	
Jacocks, John T.....'94	5 00	
James, William T.....'94–'95	10 00	
Jennings, N. Hynson .....'94	5 00	
Joergensen, Sophus .....'95	5 00	
Johnson, Charles B.....'95	5 00	
Johnson, Daniel D.....'94	5 00	
Johnston, Harry A.....'94	5 00	
Jones, Edward B.....'94	5 00	
Jones, James H.....'94	5 00	
Jones, James T.....'94–'95	10 00	
Jones, Simon N.....'94	5 00	
Jungmann, Julius.....'94	5 00	
Kalish, Julius.....'95	5 00	
Karb, George J.....'95	5 00	
Kauffman, George B.....'95	5 00	
Kebler, Lyman F .....'94	5 00	
Keefer, Charles D.....'95	5 00	
Keenan, Thomas J. .....'94	5 00	
Keene, Thomas R.....'94	5 00	
Keeney, Caleb R.....'94	5 00	
Keith, Irwin A.....'94	5 00	
Kelley, Edward S.....'95	5 00	
Kelly, George A.....'94–'95	10 00	
Kelly, Giliam J .....'94	5 00	
Kemp, Edward .....'95	5 00	
Kendrick, Harlan P.....'94	5 00	5 00
Kennedy, Ezra J.....'94	5 00	
Kennedy, George W.....'94	5 00	
Kent, Henry A., Jr.....'94	5 00	
Keppler, Charles L.... .....'94	5 00	
Keppler, Christian L.....'94	5 00	
Kerr, Frank G.....'94	5 00	
Kerr, William W.....'94	5 00	
Kiedaisch, John F., Jr....'94–'95	10 00	
Kieffer, George .....'94	5 00	
Kilmer, Frederick B.....'94	5 00	
King, George A. N.....'95	5 00	
Kirchgasser, William C.....'95	5 00	
Kirchhofer, Paul .....'94	5 00	
Kirkland, Derwentwater.....'94	5 00	
Klayer, Louis..... .....'94	5 00	
Klein, Ernest F.....'94	5 00	
Klein, Frederick. .....'94	5 00	
Klie, G. H. Charles.....'94	5 00	
Kline, Charles G.....'94	5 00	
Kline, Charles S.....'94	5 00	
Knabe, Gustavus A.....'94	5 00	
Knoebel, Thomas .....'95	5 00	
Knoefel, Charles D. .....'94–'95	10 00	
Koch, Julius A.....'94	5 00	
Koehnken, Herman H. .....'94	5 00	
Koles, Samuel M.....'94	5 00	
Kraemer, Henry..... '95	5 00	
Krehe, J. Theodor.....'94–'95	10 00	
Kremers, Edward..... ...'95	5 00	
Krewson, William E .....'94	5 00	
Krieger, Philip .....'95	5 00	
Kuder, William F.....'94	5 00	
Kuhn, Norman A.....'94	5 00	
La Pierre, Elie H.....'95	5 00	
Laing, Alfred A.....'95	5 00	
Lalmant, Eugene .....'94	5 00	
Lanetot, Henri R.....'94	5 00	
Lander, John C.....'94	5 00	
Lane, Edward B.....'94–'95	10 00	
Amount carried forward.....	$2945 00	$62 50

	Annual Dues.	Certificates.
Amount brought forward.....	$2945 00	$62 50
Last, Louis.....'95	5 00	
Lauranson, Louis.....'94	5 00	
Layton, Thomas.....'94	5 00	
Lee, Charles H.....'94	5 00	
Legendre, Joseph A.....'94	5 00	
Lehr, Philip. .....'94	5 00	
Leis, George. .....'94–'95	10 00	
Leist, Jacob L. .....'94	5 00	
Lernhart, August .....'95	5 00	
Levy, Adolph.....'94	5 00	
Levy, William M.....'94	5 00	
Lewis, Ernest G.....'94	5 00	
Libby, Henry F.....'94–'95	10 00	
Lilly, Eli.....'94	5 00	
Lilly, Josiah K.....'94	5 00	
Lisle, Justin D. .....'94–'95	10 00	
Lloyd, John U.....'95	5 00	
Lockert, Charles L.....'94	5 00	
Loomis, John C.....'94	5 00	
Lord, Frank J.....'94	5 00	
Lord, Thomas .....'95	5 00	
Lovis, Henry C.....'93	5 00	
Lowd, John C.....'95	5 00	
Lueder, Fritz .....'94	5 00	
Lundberg, John C.....'95	5 00	
Luscomb, William E.....'92–'93	10 00	
Lyman, Asahel H.....'94	5 00	
Lyons, Isaac L.....'95	5 00	
MacRae, John Y.....'94	5 00	
Main, Thomas F.....'95	5 00	
Maine, August..... .....'95	5 00	
Majer, Oscar .....'94	5 00	
Major, John R. .....'95	5 00	
Mallinckrodt, Edward.....'94	5 00	
Mann, Albert.....'95	5 00	
Manning, John H.....'94	5 00	
Marshall, Ernest C.....'95	5 00	
Marshall, Rush P.....'94	5 00	
Marsteller, George L.....'94	5 00	
Martin, John C.....'94–'95	10 00	
Mason, Alfred H.....'94	5 00	
Mason, Harry R.....'94–'95	10 00	
Massey, William M.....'94	5 00	
Matthews, Charles E.... .'94–'95	10 00	
May, Eugene.....'95	5 00	
May, James O. .....'95	5 00	
Mayo, Caswell A.....'94	5 00	
McAfee, John J.....'94	5 00	
McColgan, Adam T..... ..'94	5 00	
McComas, Percy G.....'94	5 00	
McElhenie, Thomas D. .....'94	5 00	
McElwee, Emer J.....'94	5 00	
McFarland, Robert M.....'94	5 00	
McIntyre, William .....'94–'95	10 00	
McKesson, John, Jr.....'95	5 00	
McLean, George .....'94–'95	10 00	
McNeil, John M. .....'95	5 00	
Mebane, Robert S.....'94	5 00	
Mehl, Henry W.....'94	5 00	
Meininger, Albert.....'95	5 00	
Meissner, F. W., Jr.....'95	5 00	
Meissner, Paul E.....'94	5 00	
Mennen, Gerhart .....'94	5 00	
Merrell, Ashbel H.....'94	5 00	
Meyer, Christian F. G. .....'94	5 00	
Meyer, William V.....'94	5 00	
Michaelis, Gustavus.....'94	5 00	
Miller, Jacob A.....'94–'95	10 00	
Miller, James M.....'94–'95	10 00	
Miller, Jason A.....'95	5 00	
Miller, Polk .....'94	5 00	
Miller, Turner A. .....'94–'95	10 00	
Miner, Maurice A.....'94	5 00	
Miner, Mrs. Mary O. .....'95	5 00	
Miner, Orrin E.....'94	5 00	7 50
Amoubt carried forward.....	$3380 00	$70 00

	Annual Dues.	Certificates.
Amount brought forward.....	$3380 00	$70 00
Mittelbach, William.....'95	5 00	
Miville, Francis C.....'94–'95	10 00	
Moffett, Thomas J.....'94	5 00	
Mohr, Charles C.....'94	5 00	
Moore, Charles G.....'94	5 00	
Moore, George.....'95	5 00	
Moore, John T.....'95	5 00	
Moore, Silas H.....'94	5 00	
Moore, Thomas F.....'94	5 00	
More, Arthur J.....'94	5 00	
Morgan, Aylmer L.....'95	5 00	
Morgan, Eugene H.....'94	5 00	
Morley, William J. .....'94–'95	10 00	
Morris, Wm. G.....'94	5 00	
Morrison, Joseph E..... .. '93	5 00	
Morton, John W. .....'94	5 00	
Mosher, Wm. W.....'94–'95	10 00	
Moulton, David P.....'95	5 00	
Mueller, Adolph ....'95	5 00	
Mueller, Ambrose .....'94–'95	10 00	
Mueller, Otto E.....'94	5 00	
Munson, Luzerne I.....'95	5 00	
Murphy, John J.....'94	5 00	
Murray, Emmett L.... .....'94	5 00	
Muth, George L.....'94–'95	10 00	
Myers, Daniel .....'95	5 00	
Myers, George W.....'94	5 00	$7 50
Nattans, Arthur.....'95	5 00	
Neathery, James M.....'94–'95	10 00	
Newman, George A.....'94	5 00	
Newton, Philo W.....'94	5 00	
Nichols, John C.....'94	5 00	
Nichols, Thomas B.....'94	5 00	
Nipgen, John A.....'95	5 00	
Nisbet, William W.....'94	5 00	
Noble, William W.....'94	5 00	
Noll, Matthias.....'95	5 00	
Nowers, Lawrence E.....'95	5 00	
O'Hare, James.....'95	5 00	
O'Neil, Henry M.....'94	5 00	
Oberdeener, Samuel.....'94	5 00	
Ohliger, Lewis P.....'94	5 00	
Oldberg, Oscar.....'94–'95	10 00	
Oleson, Olaf M.....'95	5 00	
Oliver, William M.....'95	5 00	
Ortmann, John H..... .....'94	5 00	
Orton, Ingomar F.....'95	5 00	
Osgood, Hugh H.....'95	5 00	
Osmun, Charles A.....'94	5 00	
Ottinger, James J.....'94	5 00	
Otto, John N. W.....'94–'95	10 00	
Overstreet, William P.....'94	5 00	
Owens, James A.....'95	5 00	
Owens, Richard J.....'95	5 00	
Parcher, George A.....'95	5 00	
Parisen, George W.....'94	5 00	
Parker, Arthur S.....'94	5 00	
Parker, Walter W.... ...'94–'95	10 00	
Parkhill, Stanley E.....'94	5 00	
Parsons, John.....'95	5 00	
Partridge, Charles K.....'94	5 00	
Patch, Edgar L..... .....'95	5 00	
Patterson, Theodore H.....'94	5 00	
Pattison, George H.....'94	5 00	
Patton, John F.....'95	5 00	
Pauley, Frank C.....'94	5 00	
Payne, George F.....'93–'94–'95	15 00	
Pearce, Howard A.....'94–'95	10 00	
Pease, Autumn V.....'95	5 00	
Pease, Francis M.....'95	5 00	
Peck, George L.....'95	5 00	
Pennington, T. H. Sands..'92–'93	10 00	
Percy, William G.....'94	5 00	
Perham, Henry A.....'93–'94	10 00	
Perkins, Benjamin A.....'95	5 00	
Amount carried forward.....	$3825 00	$77 50

	Annual Dues.	Certificates.
Amount brought forward.....	$3825 00	$77 50
Perkins, C. William.....'94	5 00	
Peter, Minar C.....'94	5 00	
Petsche, Bismarck W.....'94	5 00	
Peyton, Robert D.....'94	5 00	
Pfafflin, Henry A.....'94	5 00	
Pfeiffer, John .....'94	5 00	
Pfiffner, Fritz J. R.....'94–'95	10 00	
Pfingsten. Gustav .....'94	5 00	
Pfunder, William .....'94	5 00	
Phelps, Dwight .....'94	5 00	
Phillimore, Fred. S.....'94	5 00	
Phillips, Carrie E.....'94	5 00	
Phillips, Edwin F.....'94–'95	10 00	
Physick, Henry S.....'94	5 00	
Pieck, Edward L.....'94	5 00	
Pierce, William H.....'95	5 00	
Pile, Gustavus.....'94	5 00	
Pitt, John R.....'95	5 00	
Plawt, Albert .....'94–'95	10 00	7 50
Pleasants, Charles H.....'95	5 00	
Plenge, Henry.....'94	5 00	
Plummer, David G..... ...'94	5 00	
Plummer, Edward.....'94	5 00	
Porter, Henry C.....'95	5 00	
Porter, Louis F..... '95	5 00	
Porter, Millett N.....'94	5 00	
Potter, William R.....'94–'95	10 00	
Potts, David G..... .....'94	5 00	
Power, Frederick B.....'95	5 00	
Prall, Delbert E.....'94–'95	10 00	
Prentiss, John B.....'94	5 00	5 00
Prescott, Albert B.....'95	5 00	
Prescott, Horace A.....'95	5 00	
Preston, Andrew P.....'94	5 00	
Price, Charles H.....'94	5 00	
Price, Joseph .....'94	5 00	
Prieson, Adolph .....'94–'95	10 00	
Probeck, George J.....'94–'95	10 00	
Puckner, William A.....'94	5 00	
Punch, William F.....'94	5 00	
Pursell, Howard .....'94	5 00	
Pyle, Cyrus .....'93–'94	10 00	
Quackinbush, Benjamin F....'95	5 00	
Quandt, Arthur A.....'94	5 00	
Quandt, Ernest E.....'94	5 00	
Qvale, Victor A.....'94	5 00	
Rademaker, Herman H.....'94	5 00	
Rains, A. Brown.....'94	5 00	
Ramsperger, Gustavus .....'95	5 00	
Rand, Daniel M.....'95	5 00	
Randall, Frank O.....'94	5 00	
Rapelye, Charles A.....'94	5 00	
Rauschkolb, John .....'94–'95	10 00	
Ray, Peter W.....'94–'95	10 00	
Read, Albert M.....'94–'95	10 00	
Redsecker, Jacob H.....'94–'95	10 00	
Reed, Willoughby H.....'94	5 00	
Reidy, Michael.....'94–'95	10 00	
Renz, Frederick J.....'94	5 00	
Reynolds, Howard P.....'95	5 00	
Reynolds, John J.....'94	5 00	
Reynolds, Wm. K.....'95	5 00	
Rice, Charles.....'95	5 00	
Richardson, Horatio S.....'95	5 00	
Richter, Gustave A.....'94	5 00	
Riddell, Benjamin F.....'95	5 00	
Risenman, Joseph.....'94	5 00	
Riley, Charles W.....'94	5 00	
Robbins, Alonzo.....'94	5 00	
Roberts, William .....'94	5 00	
Robertson, Felix O.....'94–'95	10 00	
Robins, Wilbur F..... .....'94	5 00	
Robinson, Ernest F.....'94	5 00	
Rockefeller, Lucius .....'95	5 00	
Rogers, Arthur H.....'94	5 00	
Amount carried forward.....	$4270 00	$90 00

	Annual Dues.	Certificates.
Amount brought forward.....	$4270 00	$90 00
Rogers, Wiley .....'94–'95	10 00	
Rohde, Claus F.....'94	5 00	
Rosenthal, David A.....'94	5 00	
Rowlinski, Robert A.....'94	5 00	
Royston, Oliver M.....'94	5 00	
Ruddiman, Edsel A.....'94	5 00	
Rudolf, Eliza.....'94	5 00	
Ruenzel, Henry G.....'95	5 00	
Runyon, Edward W.....'94	5 00	
Ruppert, John.....'95	5 00	
Rusby, Henry H.....'95	5 00	
Russell, Dorian M.....'94–'95	10 00	
Rust, William .....'95	5 00	
Sadtler, Samuel P.....'94	5 00	
Sample, Ellmer W.....'94	5 00	
Sargent, Jesse W.....'95	5 00	
Sauerhering, Rudolph A.....'95	5 00	
Sawyer, William F.....'94–'95	10 00	
Sayre, Lucius E.....'95	5 00	
Sayre, William H.....'94	5 00	
Schaap, John.....'94	5 00	
Schafer, George H.....'94–'95	10 00	
Schafhirt, Adolph J.....'95	5 00	
Scheffer, Emil .....'94	5 00	
Scheffer, Henry W.....'95	5 00	
Schellentrager, Ernst A.....'94	5 00	
Scherer, Andrew.....'95	5 00	
Scherff, John P.....'95	5 00	
Schieffelin, William J.....'95	5 00	
Schiemann, Edward B.....'94	5 00	
Schimpf, Henry W.....'94–'95	10 00	
Schlaepfer, Henry J.....'95	5 00	
Schley, Steiner .....'94	5 00	
Schlotterbeck, Julius O.....'94	5 00	
Schmid, Henry.....'94	5 00	
Schmidt, Ferdinand T.....'94	5 00	
Schmidt, Florian C..... .....'95	5 00	
Schmidt, Frederick M....'94–'95	10 00	
Schmidt, Valentine.....'94	5 00	
Schmitt, George J. F.....'95	5 00	
Schmitt, Joseph M.....'94–'95	10 00	
Schoenhut, Christie H....'94–'95	10 00	
Schoettlin, Albert J.....'94	5 00	
Schrank, Charles H.....'95	5 00	
Schueller, Ernst.....'95	5 00	
Schueller, Frederick W.....'95	5 00	
Schuh, Paul G.....'94–'95	10 00	
Schulze, Louis .....'94–'95	10 00	
Schurk, Louis .....'94	5 00	
Schwab, Leslie W.....'95	5 00	
Schweickhardt, Richard.....'94	5 00	
Scott, Alex W.....'94–'95	10 00	
Scott, George T.....'94	5 00	
Scott, J. McDonald.....'94	5 00	
Scott, Wm. H.....'94–'95	10 00	
Scoville, Wilbur L.....'95	5 00	
Searby, William M.....'94	5 00	
Sedberry, Bond E.....'94	5 00	
Seifert, Charles A.....'94	5 00	
Seitz, Oscar .....'94	5 00	
Selzer, Eugene R.....'94	5 00	
Sempill, Walter M.....'94	5 00	
Sennewald, Ferdinand W.....'94	5 00	
Serodino, Herman.....'94–'95	10 00	
Sevin, N. Douglas. .....'94	5 00	
Shafer, Erwin C.....'94	5 00	
Shake, Homer C.....'94	5 00	
Shannon, Thomas R.....'94	5 00	
Sharp, Harry.....'94	5 00	
Sharples, Stephen P.....'95	5 00	
Shaw, Robert J.....'94	5 00	
Shelton, William A.....'94–'95	10 00	
Sherman, Charles R.....'94	5 00	
Sherrard, Charles C.....'94	5 00	
Sherwin, Eugene A..... '94–'95	10 00	
Amount carried forward.....	$4720 00	$90 00

	Annual Dues.	Certificates.
Amount brought forward.....	$4720 00	$90 00
Sherwood, Henry J.....'94–'95	10 00	
Sherwood, Louis W.....'95	5 00	
Shinn, James T.....,94	5 00	
Shreve, John A.....'94–'95	10 00	
Shriver, Henry ... .'94	5 00	
Shryer, Thomas W.....'95	5 00	
Shultz, Merriken E.....'94	5 00	
Shurtleff, Israel H.....'95	5 00	
Siegemund, Charles A.....'94	5 00	
Siegenthaler, Harvey N...'94–'95	10 00	
Sieker, Ferdinand A.....'94	5 00	
Simms, Giles G. C.....'94	5 00	
Simon, William.....'95	5 00	
Simonson, William.....'94	5 00	
Simpson, William.....'94	5 00	
Simson, William A.....'94	5 00	
Sippy, Alvin H .....'94	5 00	
Skelly, James J.....'95	5 00	
Skinner, William H.....'94	5 00	
Slack, Henry R., Jr.....'94–'95	10 00	
Sloan, George W.....'94	5 00	
Smink, Robert W.....'94	5 00	
Smink, William H. R....'93–'94	10 00	
Smith, Amasa D.....'94	5 00	
Smith, Charles B.....'94	5 00	
Smith, Clarence P.....'94	5 00	
Smith, Edward N.....'94–'95	10 00	
Smith, Edward S.....'94	5 00	
Smith, Frank P.....'94	5 00	
Smith, J. Hungerford .....'94	5 00	
Smith, James P.....'94	5 00	
Smith, Lauriston S.....'95	5 00	
Smith, Linton .....'95	5 00	
Smith, Linville H.....'94	5 00	
Smith, Reuben R.....'94	5 00	
Smith, Samuel W.....'95	5 00	
Smith, Theodoric.....'94–'95	10 00	
Smith, Thomas E.....'94	5 00	
Smith, Whitefoord G.....'94	5 00	
Smith, Willard A.....'94	5 00	
Smithson, David E.....'95	5 00	
Snow, Charles W.. .....'95	5 00	
Snyder, Alva L.....'94	5 00	
Snyder, Robert J.....'94	5 00	
Soetje, Edward C.....'94	5 00	
Solomons, Isaiah A.....'94–'95	10 00	
Sombart, John E.....'94–'95	10 00	
Spalding, Warren A.....'95	5 00	
Sparks, James M.....'94	5 00	
Spengler, John G.....'94	5 00	
Spenzer, Peter I.....'94	5 00	
Sperry, Herman J.....'95	5 00	
Squibb, Edward H.....'95	5 00	
Squibb, Edward R.....'95	5 00	
Stacey, Benjamin F.....'94–'95	10 00	
Staebler, Richard.....'94	5 00	
Stahler, William ....'95	5 00	
Stamford, William H.....'94	5 00	
Stanley, Edgar C.....'94	5 00	
Staudt, Louis C.....'94	5 00	
Stedem, Frederick W. E.....'94	5 00	
Steele, George R.....'94	5 00	
Steele, James G.....'94	5 00	
Stein, Jacob H.....'94	5 00	
Steinhauer, Frederick .....'94	5 00	
Stewart, Francis..'91–'92–'93–'94	20 00	
Stoehr, Julius J.....'94	5 00	5 00
Stoff, Louis..... .....'95	5 00	
Stong, Franz S.....'94	5 00	
Stoughton, Dwight G.....'94	5 00	
Stowell, Daniel .....'94	5 00	
Sweet, Caldwell.....'94	5 00	
Taylor, John P.....'95	5 00	
Thomas, Robert, Jr.....'94	5 00	
Thompson, Frank A..'92–'93–'94	15 00	
Amount carried forward.....	$5170 00	$95 00

	Annual Dues.	Certificates.
Amount brought forward.....	$5170 00	$95 00
Thompson, William Silver....'95	5 00	
Thompson, Wm. Scott (D. C.).'94	5 00	
Thomsen, John J.....'95	5 00	
Thorn, Henry P.....'95	5 00	
Thurston, Ayer.....'95	5 00	
Tiarks, Hermann .....'95	5 00	
Tigner, James O. .....'94	5 00	
Tilden, Amos K.....'93–'94	10 00	
Tobin, John M.....'93	5 00	
Todd, Albert M..... ...'95	5 00	
Tomfohrde, Charles W....'93–'94	10 00	
Tomfohrde, John W.....'93	5 00	
Topley, James. .....'95	5 00	
Torbert, Willard H.....'95	5 00	
Tracy, David W.....'94	5 00	
Trautmann, Ludwig.....'94	5 00	
Travis, J. Walton.....'92	5 00	
Treat, Joseph A.....'95	5 00	
Treherne, John C.....'94	5 00	
Truax, Charles .....'95	5 00	
Tucker, Greenleaf R.....'94–'95	10 00	
Tucker, Mosely F.....'94	5 00	
Tuma, Bruno .....'94–'95	10 00	
Turner, George H.....'94	5 00	
Turner, John P.....'94	5 00	
Turrell, Judson W.....'94	5 00	
Uhlich, Ferdinand G. .....'94	5 00	
Van Antwerp, Andrew .....'94	5 00	
Van Antwerp, Garet .....'94	5 00	
Van Winkle, Abraham W.....'94	5 00	
Vargas-Heredia, Jorge....'94–'95	10 00	
Vaughan, Parry W.....'94	5 00	
Vickers, Rufus W.....'94–'95	10 00	
Vilter, Hermann T. .....'94–'95	10 00	
Vockroth, Emil .....'94	5 00	
Voight, Joseph F.....'94	5 00	
Vordick, August H.....'94	5 00	
Voss, George W.....'95	5 00	
Wagner, Henry.....'94	5 00	
Wagner, William I.....'94	5 00	
Walhach, Arthur .....'94	5 00	
Walker, David .....'94–'95	10 00	
Walker, John P.....'95	5 00	
Walker, William J. .....'94	5 00	
Wall, Otto A.....'94	5 00	
Ward, A. Jae.....'94	5 00	
Ward, Charles A.....'95	5 00	
Ward, George J.....'94	5 00	
Warn, William E.....'95	5 00	
Warren, Edwin A. .....'94	5 00	
Warren, William M.....'94	5 00	
Washburn, Harry M. .....'94	5 00	
Watson, Herbert K.....'94	5 00	
Watson, Sidney P.....'94–'95	10 00	
Way, David .....'94	5 00	7 50
Way, Frank Lester .....'93	5 00	
Amount carried forward.....	$5495 00	$102 50

	Annual Dues.	Certificates.
Amount brought forward.....	$5495 00	$102 50
Weaver, John A.....'94	5 00	
Webber, J. Le Roy. .....'94–'95	10 00	
Wehrly, Thomas M.....'95	5 00	
Weihe, Otto A.....'94	5 00	
Weiser, William A.....'94	5 00	
Wells, Charles H.....'94–'95	10 00	
Wells, Edwin H.....'94	5 00	
Wenzell, William T.....'94–'95	10 00	
West, Charles A. .....'95	5 00	
Westcott, James W.....'93–'94	10 00	
Westmann, Frank H. .....'94	5 00	
Wetherell, Albert S.....'95	5 00	
Wetterstroem. Albert S.....'94	5 00	
Weyer, John .....'94	5 00	
Whall, Joseph S.....'94	5 00	
Wheeler, William D.....'94	5 00	
Whelpley, Henry M.....'94	5 00	
Whitcomb, Frederick E.....'94	5 00	
White, George H.....'93–'94	10 00	
White, Richard E.....'94	5 00	
Wichelns, Frederick.....'95	5 00	
Wickham, William H.....'95	5 00	
Wienges, Conrad. .....'93–'94	10 00	
Wilcox, Frederick .....'95	5 00	
Wilder, George P.....'95	5 00	
Wilhite, Frank T. .....'94–'95	10 00	
Williams, Duane B.....'94	5 00	
Williams, John K.....'94	5 00	
Williams, Richard W.....'95	5 00	
Williams, Seward W.....'94	5 00	
Williams, William H. .....'94	5 00	
Wills, Fred. M.....'94	5 00	
Wilson, Charles F.....'92	5 00	
Winters, Aaron.....'94	5 00	
Wood, Alonzo F., Jr. .....'95	5 00	
Wood, Edward S.....'95	5 00	
Wood, James P.....'95	5 00	
Woodman, Walter I. .....'94–'95	10 00	
Woodruff, Roderick S.....'93	5 00	
Wooldridge, Daniel T.....'95	5 00	
Wooten, Thomas V.....'94	5 00	
Wright, Arthur W.....'94	5 00	7 50
Wulling, Frederick J. .....'94	5 00	
Wunderlich, Edward.....'94	5 00	
Wurmb, Theodore H.....'94	5 00	
Wyckoff, Elmer E.....'94	5 00	
Yearby, William M.....'94	5 00	5 00
Young, Hiram W.....'94	5 00	
Young, John R. .....'94	5 00	
Zellhoefer, George .....'94	5 00	
Zimmermann. Albert.....'94–'95	10 00	
Zimmermann, Charles.....'95	5 00	
Zoeller, Edward V.....'94	5 00	
Zuenkeller, J. Ferd.....'95	5 00	
Zwick, George A.....'95	5 00	
Total	$5815 00	$115 00

MINUTES

OF THE

SECTION ON COMMERCIAL INTERESTS.

FIRST SESSION, THURSDAY AFTERNOON, AUGUST 15.

Mr. Geo. J. Seabury, Chairman, called the Section to order in the following words:

My first duty in calllng the Section to order is to note the absence of our Secretary, Mr. Burge, whose business affairs prevent his attendance at this meeting. Nominations will be in order for a substitute.

Mr. Clay W. Holmes, of New York, was nominated, and, upon motion, the nominations were closed, and Mr. Holmes declared the unanimous choice of the Section for Secretary.

The Minutes of the meeting at Asheville were read by the Secretary, and approved.

Chairman Seabury then read his address to the Section, as follows:

Fellow Members: At our last meeting in Asheville, I directed your serious attention to an impending crisis in our professional and commercial interests, and then predicted that the situation of affairs would in another year be intensified instead of diminished. Much to my chagrin, those apprehensions have been more than realized.

In addressing you in these elevated regions, where lofty heights and an exhilarating atmosphere lend inspiration to the theme, I have deemed it advisable to preface my address with an introductory. It is not my purpose to unravel the mysteries of the obscure ages, to weigh and consider the epochs of Hippocrates, the Alchemist, Galen, or the time-honored apothecary. Comparisons with primitive society do not concern us. We must devote our energies to modern problems and their impression on the intelligence of the present age, especially the relations which should exist between physician and pharmacist, and the mercantile relations between the wholesale druggist, pharmacist, manufacturer of medical and pharmaceutical preparations, and manufacturer of proprietary medicines and nostrum vendors.

The ideal and practical relations that have existed for centuries between the medical and pharmaceutical professions are essentially professional, both being classified in the highest realm of human responsibility, particularly as they are the promoters of our physical and often mental well-being. So important are their duties, that laws have

been enacted for their protection against quackery and incompetency in every State in our Union, which ultimately must become national.

Malpractice committed in any form, whether by surgeons or medical practitioners, or as errors made by pharmacists or druggists, in compounding prescriptions or medicines, adulterating drugs, chemicals and medicines, is subject to severe State penalties. These safeguards for the legal protection of the public have been inflicted as a recompense and check for the special protection granted in confining the practice to properly educated and registered members in both professions. Consequently, the conditions under which they operate in the interest of the public welfare are serious and actionable, and the time is appaoaching when Pharmacy must receive additional protection in order to remove it from trade encroachments.

The Governor of Colorado and the Mayor of Denver both agree that the pharmacist is often of greater importance to the patient than the physician who has prescribed for his ailment. His superior knowledge of Pharmaceutical Chemistry, Toxicology and Posology has saved the reputation of thousands of physicians. By a nervous stroke or slide of the pen, or pencil, or by a mere assumption, fatal doses have been written. The most brilliant practitioners throughout the world have made such mistakes; they are not infallible. But for the vigilance and education of the pharmacist, the patient would have entered a premature grave; but, like a true guardian of his professional brother, the prescription is returned to the physician for explanation or correction, the patient lives and is none the wiser for the terrible error. This restraint alone is worth all the protection vouchsafed pharmacy, and should be instrumental in forging both professions into a sympathetic and fraternal alliance for mutual benefits.

These ethical relations are universally respected, but with us the connection is degenerating through accidental and compulsory causes founded on the law of self-protection.

We will now treat the dominant influences that reign supreme in our mercantile affairs. Our purely material interests are centered in our trade relations; they are of the highest importance; they act and react between the wholesaler, retailer, manufacturing pharmacist, and manufacturers of proprietary medicines and nostrums; through them we prosper or are plunged into a state of demoralization.

The introduction of cut prices by the Department Store and Commercial Druggist precipitated a disruption in our commercial affairs about the year 1882. In order to restrict a progressing evil the first general protective plan was established and organized under the name of the Campion Plan; connected with this plan was the Contract Plan and a Manufacturer's Plan for the exclusive benefit of the wholesaler; there was also a Coupon Plan for the retailer, but that scheme was strangled in its infancy.

The history connected with the collapse of the Campion Plan will be highly interesting to our younger members; and I have deemed it advisable for our present information to reproduce several extracts from a pamphlet issued in 1882, entitled "The present and prospective Trade Relations of the Manufacturer, Wholesaler and Retailer, and a glimpse at the future of the Drug Trade." This work was an appeal to the Manufacturers of Proprietary Medicines and the Wholesale Drug Trade, which was written in connection with a series of articles on "Shall Pharmacists become Tradesmen?" Had the Chairman of this section no other views to express on the present situation, the reiteration of the subject referred to in 1882 would be fully abreast of the times without composing a line.

With your indulgence I will refer to its reflections on the Campion Plan; it explains the behavior of our mercantile allies and the causes of failure.

"The Campion Plan to this date, 1883, is the simplest yet devised *that can be executed* without being burdensome to those involved and without necessitating penalties for violating its expressed provisions; when penalties are requisite it will become repugnant and will naturally sound the alarm for the downfall of all protective plans. Therefore, to quote from one of my earliest articles, "Any plan that unnecessarily multiplies labor

without sufficient compensation will never receive proper or careful attention. Distributors are not willing guardians."

This criticism was applied to the Coupon Plan. The Campion Plan consequently only requires the wholesaler and retailer to sign a simple agreement with the manufacturer not to supply his articles to those who are not entitled to them, and to maintain the established prices. That it is executed honorably and cheerfully is abundantly attested to by thousands throughout the United States, who have endorsed it, and who have satisfied their competitors that its obligations can be conformed to when the effort is made. If the Campion Plan does not succeed, no other plan can succeed. A distributor who cannot keep this agreement will violate any obligation or agreement, and that is the length and breadth of the opposition to this plan; the moment some better plan is introduced the Campion will be discarded and the best adopted. As I understand it, the Manufacturers' Protective Union, for their own protection and success, will only receive into its body those whom Mr. Richardson qualifies as proprietors, who have a price that every wholesaler can depend upon and who actually control their productions.

The Campion Plan will be a failure if our reciprocal powers are not exercised, or if we fail to condemn, in vigorous language, our own offenders and cutters; and we must admit that wholesalers who evade or secretly undermine mutually protective acts (whether in the Campion, or Contract agreements) or who in any way take advantage of honorable competitors, are in no sense superior to cutters.

In attempting to do my duty towards offering a solution for the preservation of our interests, and the suppression of an augmenting calamity, it is my firm belief that no plan can succeed unless it is bound by a tripartite reciprocal agreement, composed of the manufacturer, the wholesaler and the retailer. The fundamental layer in the structure is the retailer, who, being the weakest, most needs protection; second is the wholesaler, who is the supplier, and, consequently, the most important and independent in a business way, distributing, either from victory or defeat, about 95 per cent. of the productions of the manufacturer; lastly, the manufacturer, who, by natural selection, has wisely placed his goods with the pharmacist and druggist for distribution to the actual consumer. These natural allies acting in unison, can, under mutual agreements, remedy successfully any evil in our midst in a comparatively short time. Whether success is delayed or hastened, depends wholly on vigilance and honesty on the part of the wholesaler and retailer. The manufacturer, holding a neutral position, sustains his obligations in the refusal to deliver goods to those who violate their agreements. We cannot, therefore, but acknowledge that the manufacturer occupies a purely protective attitude in the interests of the distributor and retailer.

We have now in the United States 662 reputed wholesale druggists, about 200 exclusively wholesale, since decreased by firms consolidating, which leaves a majority that are both wholesalers and retailers. Out of this entire number not more than seven wholesale concerns, and a few unknown firms, altogether about one-tenth of one per cent. of the whole, at present believe in unrestricted free agency.

Out of 28,000 pharmacists and druggists, the entire number of cutters, with re-instatements subtracted from the "cut-off" list, amounts to less than 200. Removing from that list dry goods firms and tradesmen, and I regret to add, a few wholesale druggists, t will be less than three-fourths of one per cent. against whose irregular and unjustifiable methods are opposed $99\frac{9}{10}$ per cent. among wholesalers, and $99\frac{1}{4}$ per cent. of the retailers, showing a power—a moral power—that should be simply irresistable. With such an exposition of facts, with such an overwhelming majority, with such a crushing force in a just revolution, will this Association continue to be deaf to the entreaties of the oppressed, or shall we quietly allow a reckless minority, an uncontrollable minority, to rivet the shackles of misery more tightly to our interests? Have not we a moral and justifiable right to reform this supercilious minority who violate agreements, thereby en-

dangering our trade advantages, and who then, like the ostrich (poor deluded creature), imagine they can secrete their operations by hiding their heads in ambush, while exposing to view their entire bodies! Why, we have more respect for an adversary who stands like Ajax, defying the lightning, and when the crash comes and immolates him, we can with propriety offer our sympathies and regret his desperate folly! Wholesalers who are over-ambitious and fond of experimenting, will always have a large field to operate in, without distributing articles that can be sold at a uniform discount, so that at least on that class of goods we can be ensured an acceptable profit.

Since writing this address, a large number of druggists in Brooklyn have adopted the schedules of the original cutters, and as a sequence were added to the cut-off list. It is openly acknowledged that this move was deemed advisable so as to induce a large majority to return to established prices. The percentage, therefore, will not be affected on the whole, and as a few concerns—not over twenty on the entire Atlantic stretch down to Baltimore—are responsible for the introduction of the shopkeepers' or tradesmen's system of selling proprietary goods, the percentage will undergo a still further decrease. and make the actual percentage against cut rates nearer $99\frac{9}{16}$ per cent. In New York, Brooklyn, Philadelphia and Boston, the arch-cutters, a majority of whom were in the dry goods business, have compelled druggists nearest them to adopt similar prices as a matter of self-protection. It can be safely stated that cities outside of those previously mentioned have overcome their commercial evils by co-operative protection, proving that the grievance can be remedied by concurrence of the wholesaler and retailer in fidelity to their mutual contracts. Retailers in several of the largest cities owe their failure to the want of unity in executing agreements and resolutions which strengthened organized opposition, and which were passed for the promotion of success. The general judgment is that the Campion Plan is a success everywhere except where wholesalers and retailers violate their agreements, and that is the whole truth.

The business relations between wholesalers and retailers are so sympathetic and so intimate that unwise methods of the one or the other will prove mutually disastrous. Occasionally, from pure desperation, or possibly from malice, a concern will adopt a policy of aggressive competition. What is the result? A great many others, under the impression that such a course will decentralize their trade, which it does, simply resort to the same methods, and thus a dog-in-the-manger warfare is precipitated, which robs business of all pleasure and profit. We all remember when the entire wholesale drug trade was in that position, and what did it lead to? It resulted in a spirited discussion of our grievances, in the consideration of the means necessary for protection, and in the adoption of such resolutions as led to the framing of the Contract Plan, and thereby ensured a living profit from the sale of proprietary goods. They succeeded, after a few years of persistent toil and agitation, and it was a reformation for the general good. It injured no one, not even the few firms who considered themselves the dictators and owners of the drug trade. These few struggled hard in the traces for commercial liberty, but could not sever the fetters that were fixed by this Association, and finally entered into the same obligations, either through persuasion or self-interest. The laws of the distribution are immutable. No man delights in being dispossessed of what he considers his own property by succession, priority, or divine right. To be impartial, we must not be blind to our own weaknesses, or to a destiny that shapes our future and is based on natural causes.

The position of manufacturers is comparatively neutral, so long as their interests remain unjeopardized by trade eccentricities or irregularities. They have been blind to their own interests. When their articles were usurped and sold at nearly cost prices by alien branches of trade, manufacturers undoubtedly assumed that such practices led to an increased consumption; but every wholesale druggist understands that that argument is a fallacy, and knows that such methods decrease trade, for the reason that the con-

sumer will only purchase a medicinal article when his nature requires it, and will then buy it, as a rule, of his nearest druggist, which was the good old-fashioned way.

Manufacturers as a class, having endorsed the cutting of their own goods, are alone responsible for losing the *quasi* recommendation of druggists, as well as for the introduction of specially prepared substitutes, through which the retailers at least received fair compensation. Cutters in the retail drug trade have simply adopted the policy of tradesmen, by making an important attachment of the liquor business, and they are also strong advocates of substituted goods when the genuine is demanded. A careful study of these combined influences, the loss of the druggists' endorsement, and the generous disposition to sell substitutes, has eventually opened the eyes of several manufacturers so far as to induce them to enter into a defensive union, calculated to protect their trade-marks and to put a quietus on under-selling their established prices.

We have about a score and over of excellent gentlemen who have established a Manufacturers' Association, which represents several well-advertised proprietary articles. This association meets at intervals; the members pass resolutions acknowledging the commercial evils that oppress the retailers, admit that the grievances of the retailers are well founded, and are consequently entitled to protection: quietly pass more resolutions, full of sympathy, full of pathos, full of dazzling platitude, and separate, believing that they have accomplished something for their mutual protection, by a masterly piece of strategy *that protects no one*, yet they assume that they have secured the good will of the retailer by saving their trade-marks from substitution. They say, "Well, it is too expensive to join the Campion Plan Association, especially as, after all, it may be only an experiment." We know, however, that this plan is no longer an experiment, since we have proven conclusively that the operations of a tripartite agreement can be uniformly, safely and successfully administered by an honorable, compliance with its provisions, while it can only be defeated by duplicity. We do not deny that few members of the Manufacturers' Association have joined the Campion Plan Association, but our remarks apply to the majority. Let us hope that the judgment of the majority is sound, but, for one, I doubt it.

There can be no objection to a certain class of non-secret remedies. The manufacture of family remedies, as a fundamental principle and of right, belongs to the pharmacist and druggist. The greatest objection that we can urge against a special class in this category, are those articles that the manufacturers themselves assure the drug trade in their printed list "are simulated in package and style to popular advertised proprietary medicines;" this admission is clear, and means nothing more or less than open commercial piracy, and points conspicuously to the object that makers of non-secret remedies had in view when they embarked in that class of specialties. The time was ripe, a few years ago, for substitution, when dry goods dealers and a few druggists sold popular articles at little or no profit; the manufacturers of well-known articles were blind to their interests; but we must all admit that it is not legitimate to infringe upon trade-mark rights in any such manner. *I am not defending so-called patent medicines or nostrums*, but I am defending legitimate trade-marks of any description, in any branch of commerce. An infringment is an injustice and an injury to the owner of an established trade-mark, and such action should be condemned. Any qualified person has an indisputable right to make "non-secret" medicines, but he has no right to simulate genuine trade-marks for the purpose of deception.

The non-secret preparation manufacturer superficially poses as an anti-monopolist, and judged by his own language, convicts himself without judge or jury of aiming at very dishonorable practices. He hurls anathemas at proprietary medicine vendors, terms them frauds and other beautiful characters; but if he will only read his own sentences, he will find that he is a prominent member of the same family that he censures. "Down with proprietary and secret medicines, but gentlemen," he pensively remarks between his argu-

ments, "buy all your family medicines of me! Since, by education and experience, dispensing pharmacists and druggists are incapable of preparing their own family medicines, by a mysterious agency, known only to ourselves, we have become the sole possessors of formulas which are always true to the equivalents printed on the label." He thus almost counterfeits the genuine preparations and assists you in palming off goods that are put up to simulate forms and sizes of like popular goods, thus introducing a pernicious influence in pharmacy, the object of which is glaringly transparent. *More than ordinary caution should be observed in indorsing this class of products. These preparations not bearing the maker's name, and being compounded from printed, or unknown formulas, you assume the responsibility by affixing your own label. In case of injury to the consumer, it might lead to serious complications. This observation applies to all name-goods.*

The maker of non-secret medicines is naturally and openly the advocate of cutters and department stores, for he delights in quoting the enemies of legitimate methods, and until the druggist prepares his own family medicines, non-secret medicines will flourish in imitation of honest trade-marks.

Along the Atlantic States enterprising dry goods dealers are not only adding the minor family remedies and medicines in perfected packages, but are selling pharmaceutical preparations of their own make. Who knows but what we may yet find wholesale dry goods dealers competing with us, under the assurance that they have carefully selected drug stocks, thus adding a counter-irritant for your future benefit. (!) These are incipient symptoms of more or less concern, but if we act vigorously in suppressing scalpers and interlopers, we shall prevent future enlistments among irregular dealers in the wholesale drug trade.

Messrs. Richardson, Meyer of St. Louis, Myers of Cleveland, Kelly of Pennsylvania, Van Schaack of Chicago, Kline and others of the National Wholesale Druggists' Association, have continuously represented for the benefit of this Association, its best elements, because they have seen this revolution from its true standpoint. The last named gentleman truthfully states in a recent article: "I desire to appeal to what I believe to be a very small minority of jobbers, who wink at large orders for Campion goods coming from fictitious parties, or from unusual sources, or from regular customers, it may be, but for unusual quantities, for more honest scrutiny of such orders," to which I will add "or to cut-off dealers to whom they supply contraband goods either by a charge purporting to be 10 or 20 ounces of Morphine, but which really represents a quantity of proscribed patent medicines they have agreed not to sell to such persons, or when they employ their subordinates to undertake the delivery of such articles in a variety of surreptitious ways."

Mr. Kline continues:

"Meanwhile what a picture it is to see those wholesalers who straddle this question dealing out sympathy and good wishes for the success of the enterprise to legitimate pharmacists on the one side, and suggestions how the plan can be circumvented and wishes that it may be, on the other, balancing themselves by an air of lofty contempt for the details of the whole business, and chuckling over the assurance that in either case their commissions are safe.

"Be convinced that the day of reckoning is coming. Scan calmly the present list of cut-offs, and inquire closely into their antecedents and present standing in the world of pharmacy, and answer honestly whether you would rather land on their side of the question or not. If not, give present honest adherence to the scheme, and suggest such improvements as you think can be made, and the whole difficulty will speedily vanish from our midst. Is it not worth a serious effort?"

Any wholesale druggist or dealer that is so much of a tradesman as not to act in sympathy with protective plans for the benefit of his natural customer, had better change his occupation and become a general merchant instead of a druggist. The retailer possesses power, and he will soon exercise it, by demonstrating to every free trade wholesale

druggist the excellence of a protective policy on his own behalf. If we do not understand where our trade interest lies, then why was the Association established? It owes its life to trade disturbances. Now, gentlemen, complete your work so well begun eight years ago, by putting a quietus on every wholesale and retail scalper in the United States. We are prevented from securing a victory for the retail druggist by a few wholesalers who are not an honor to us in so just and wholesome a cause, because with one hand they sign agreements that every respectable wholesaler can keep, while with the other they deal out sympathy, as Mr. Kline puts it, by supplying any person that demands them the very goods which they have agreed not to place in the hands of disqualified dealers. Can we respect or call honorable such concerns or individuals? We are judged by our acts, which are the only true measurements of honor. To act consistently, members of this Association, when found guilty on convicting evidence, of violating mutual agreements, should be expelled and stricken from the roll.

In the future of the drug trade is involved the stability and perpetuation of the proprietary medicine business as an allied branch and specialty of our interests. It owes its present strength to the extraordinary number of so-called patent(?) medicines (a libel on the Government), about 85 per cent. of which can be safely transferred to the classification established by the Salamander and Indian orator from Chicago, who names them for our laughter, "Aunt Sally's or Dr. Snook's oleandered, four-horsed power, double-somersault, nickel-plated, life-rejuvenating, liver-enlivening, microbe-destroying balsams or syrups." In another generation the public will be wiser, and the superstitious power now mysteriously exercised by the audacious descendants of the fabled alchemist, the Abracadabra juggler, and the Seventh Son, will pass into merited obscurity. Our colleges of pharmacy, pharmacy laws, and boards of pharmacy will vigilantly protect the professional status of the future, and educate the consumer to discriminate between the true and the false.

Therefore we must consider the strong probability of the gradual and eventual absorption of the proprietary medicine traffic by the wholesale druggist, a chance that will be wholly due to the maintenance of the Contract Plan. By the abolition of the Contract, Campion, or other protective plans, the proprietary medicine trade will once more rise, phœnix-like, from its ashes, and accumulate greater power than ever before by reason of under-selling by distributors and an increase of proprietary medicine dealers in large distributing centers. The manufacturer cannot hazard such a transformation, as it would disconnect his interests from a source that has been of the greatest benefit to him, the semi-indorsement of pharmacists and druggists; consequently, it is plainly to his advantage to sustain the Contract Plan and all other plans tending to retain the friendship of the drug trade. The Contract Plan is as irritating to proprietary medicine dealers as it is to two or three wholesale druggists.

About six months ago an independent manufacturing wholesale druggist undertook to lecture druggists in open meeting for substituting other similar goods in place of the speaker's manufactures, and pensively quoted two lines from Burns, "Oh, wad some power the giftie gie us, to see ourselves as ithers see us." How quickly irregular practices strike men when they are directly affected, even those evils to which previously they never hesitated to lend themselves! The gentleman undertook to belabor others for practices of which his own firm were often guilty.

The future prosperity and peace of the drug trade demand that the mutual relations of the manufacturer, wholesaler and retailer shall be sustained whenever our affairs are unreasonably assailed. To protect the retailer in any justifiable revolution, we must call to our aid the wholesaler and manufacturer. To protect the manufacturer we must appeal to the wholesaler and retailer. To protect the wholesaler, the manufacturer and the retailer must clasp hands. To protect ourselves against interloping tradesmen, or to suppress trade vandalism, we must all clasp hands. Can anything be clearer than our mutual commercial relations for the advancement of reform and trade interests?

Some firms do not seem, or are unwilling, to understand where their true interests lie. They are prepared on any and every occasion to espouse any desperate departure from established principles. They say, "We shall operate in the direct line of our interests." Let us propound this interrogatory: Who are directly interested? Dry goods dealers, cutters, or general tradesmen? Is it advisable to introduce the arts of pure and simple "merchandising" into the drug trade? The logic of a few would embrace any purchaser with good, bad or indifferent intentions, so long as he paid for the articles, no matter how much damage was inflicted. Let us be just. Is not the pharmacist, druggist or recognized dealer in drugs our legitimate customer and support? Pharmacists are not trained merchants. They were educated to serve the physician and the patient. Not to buy and sell goods cheap, but rather to make every article strictly after the Pharmacopœia, and in the best possible manner for the benefit of the public, who hold them responsible by legal enactments. The drug business is safe enough in our hands, by education and training; and whether or not we supply the goods to tradesmen, *the outlet or consumption per annum will not be one dollar more or less.* The question is whether we shall hazard an exchange of customers, or suppress among ourselves any attempt at consigning us to unexpected or undeserved commercial practices that are conspicuously ruinous. If a limited number of wholesalers prefer a vacillating policy, it will end in the transfer of proprietary medicine to shop-keepers, at least in large cities, whilst retailers will peacefully protect themselves by manufacturing their own medicine for family use.

Should free trade ever find its way into the general drug trade? I shall answer that negatively, and offer as an argument that its principles are unfavorable in their tendencies, and should never be tolerated. The exhibition of unfettered free trade leads with unerring directness to adulteration. Our pre-eminent position among semi-professional mercantile interests, and the necessity that wholesalers, as a class, should provide pure drugs for the physician, druggist and patient, renders it requisite to separate it, for the public welfare, from such dangers. Intense competition suggests to the weak only one remedy for the unequal struggle, and that leads to adulterations and dilutions, a practice which eventually is most disastrous and injurious to the physician and the actual consumer. Premiums on honesty should not be established, but by fair compensation for legal responsibility and services, men will be led to respect the highest principle of human action, and to sell pure goods.

CONTRACT PLAN VIOLATIONS.

When violations of the Contract and Manufacturers' Plan were reported to the Committee on Proprietary Medicine in the National Wholesale Druggists' Association, were the arraigned firms proceeded against? No; the complaints were suppressed, and the Scotch verdict rendered—"Not guilty, but don't do it again." But where was the retailer considered in the plan? He was awarded his status by having his name published on the cut-off list. What mockery! And that is what the censors term justice. I define it as persecution, for there are hundreds of druggists who are not cutters from choice. In fact, all cut to meet competition in affected localities.

> "There is a destiny that shapes our ends,
> Rough hew them how we may."

In concluding this reproduction of historical facts, the failure of this and other similar protective plans, although costly experiments, that have had as their object the perpetuation of the so-called patent medicine and nostrum traffic, have been in my judgment "a blessing in disguise" for the progress of pharmacy, the pharmacist and the public.

Here let us drop the curtain, imagine a lapse of thirteen years, and like Rip Van Winkle, rub the dust out of our eyes, stretch our arms and limbs, look around us, and craftily shake our heads, while from a distance is heard a deep significant growl from "Old Dog Snyder."

Now for the situation in 1895.

"MUST THE MIDDLE MAN GO?"

Is an interrogatory we often hear in every branch of business, and has been fermenting many years in connection with our trade interests. Competition and the meagre profits realized by merchants have led a vast majority to disregard the rights of manufacturers, and will have great influence in the answering of this query, as usual. Substitution is also the father of this question, and is a leading cause for the slow but ultimate desertion of the physician and pharmacist from his natural suppliers.

From the very fact of wholesale druggists being unwilling or unable to stock twenty lines of similar manufactures, or buying one line in consequence of receiving special advantages from some firm, the answer to the above query is gaining a rapid solution. When the retailer fails to receive what is demanded by him on his regular requisition, he remonstrates with his supplier, and is soothed with the stereotyped response: "We did not have the goods you ordered in stock, so we sent you something just as good" (*on which we make more profit*,—they omitted to add). This has forced manufacturers of standard goods to come into closer commercial relations with the pharmacist; and so long as substitution is the order of the day, just so long will the manufacturer court the business of the retailer for mutual protection, on terms satisfactory to both parties.

The problem so far as the jobber is implicated is easily solved; it is a purely casuistical one; the middle-man has no moral or dictatorial right to change his patron's orders when the make is specified, for the demand may come from a physician, and the pharmacist is in honor bound to deliver what has been ordered.

In several of our largest cities where the cut-rate, or "at cost" policy is still the ruling passion, an appalling proportion of pharmacists are controlled by wholesalers; such unfortunate druggists have lost their independence, and must accept what is furnished them, even though they stipulate their preferences; should they remonstrate, their supplies will be cut off; these are the victims made by the arch cutters and muslin druggists, and they are publicly denounced as extortioners and robbers. This assertion, which is the crystalization of injustice, is made only by mercenary commercial sharks.

I admit that the wholesaler encounters many difficulties in his commercial relations with the retailer. Over-enterprising concerns have introduced irritating mercantile policies which must be met even though they are unprofitable and unbusinesslike. Free boxes, free cartage, and soon free containers and free transportation, will be demanded; no wonder that Substitution is practiced in order that a fair profit on sales may be secured, but the practice does not secure him immunity from condemnation.

A natural alliance exists in all settled countries between the wholesaler and retailer in drugs and druggists' materials, and they are ever ready for offensive and defensive measures whenever their trade rights are assailed.

At the eleventh hour the answer to this query is furnished by one of the luminaries of the National Wholesale Druggists' Association through a letter published in the "Oil, Paint and Drug Reporter" of August 5th, responding to an invitation to submit his views on the feasibility of forming a National Association of the Chemical and Pharmaceutical Manufacturers, having as a collateral object the maintenance of uniform prices. The letter reads as follows:

"MINNEAPOLIS, MINN., *July* 24, 1895.

"We infer from your letter that you are of the opinion that the jobber would derive the most benefit from the fruition of this movement. This is by no means the case. If the manufacturing pharmacists could unite on some settled policy, they would derive fully as much benefit as would the jobber. It seems to us that it will be absolutely necessary to get this business on some well settled basis, and that they must pursue the policy either of selling the jobbers or of selling the retailer. The time has come when the jobber will no longer submit to the manufacturer selling the cream of the trade and leaving him the "pick-ups." The manufacturing pharmacist must choose between the two, as the jobber will certainly rebel if the

present policy of giving retailers practically a jobbing price is continued. The movement of the New England Grocers' Association is on exactly parallel lines to that outlined above, and will be the inevitable result in the drug business if the present methods continue. In saying this we do not mean to intimate that the manufacturing pharmacist has been alone to blame for the present condition of things. The jobber in many cases is pushing goods of his manufacture, often in imitation of those originated by the manufacturing pharmacist, and has thus further complicated matters. This we believe has been the result of necessity and in retaliation for the acts of the manufacturing pharmacist. We have long been of the opinion that if the manufacturing pharmacists could work in harmony and adopt a policy that would be just to the jobber, he would be glad to meet them halfway and would use his efforts for the distribution of their goods rather than those of his own manufacture. There must be some middle ground on which all can meet, and we therefore hope that the effort will continue, and we wish it all success.

"For ourselves we will promise our hearty co-operation, as we believe present methods are unmercantile and will lead to demoralization and loss to both pharmacist and jobber. Uniformity of prices is, perhaps, more than can be expected. We would rather see the policy of producing and exploiting in the hands of the manufacturer, stocking and distributing in the hands of the jobber, with a fixed discount to the wholesaler and another discount to the retailer and consumer, all parties to observe the schedule fixed.

"Trusting that we have fully answered your question, we remain,

"LYMAN-ELIEL DRUG CO.,
"J. C. ELIEL."

When wholesalers dictated to manufacturing pharmacists how they should manage their business, manufacturers politely suggested to them that they had better look after their own affairs. As a reward for such wholesome advice, many jobbers retaliated by substitution and by boycotting the goods of any objecting manufacturer. For a nine days' wonder, Mr. Eliel voluntarily tells some truths out of school, and it is about time that some one was frank enough to assign genuine facts; but he failed to tell the whole truth when he states, "This we believe," speaking of substituting, "has been the result of necessity and in retaliation for the acts of the manufacturing pharmacist." Such statement to my knowledge is not the truth; the wholesaler was the original "Simon Pure" transgressor; he substituted years ago when there was no necessity for it, and he substitutes now because he has acquired the habit of it and cannot help it—it has become "bug nature" with him; while the manufacturing pharmacist has simply followed the written law of self-protection in behalf of his interests, by cultivating the trade of the retailer direct, and this policy will continue until the substituting wholesaler amends the error of his dishonorable ways.

This protective principle is easily accounted for; in some nations the practice of pharmacy is restricted exclusively to qualified practitioners through legal enactments, even where free commercial intercourse is the policy, as in Great Britain; the jobber is willing to promote the interests of his customer with the severity of a family tie to such an extent that they will not retail goods in their establishments to the public, and that should be the course pursued in justice to the interests of the retailer in our own country.

It is gratifying to know that we have a small minority of wholesalers in the United States, and manufacturers, who remain true as steel to their patrons, and such allegiance on their part often means a loss of business to them by their unwillingness to solicit or encourage sales to cutters and to commercial octopuses in alien branches of trade, yet it is discouraging to them, particularly when retailers in their localities patronize firms that are only too anxious to serve their enemies in trade.

THE SIN OF SUBSTITUTION.

Extract from the address of President Fennel, of the Ohio Pharmaceutical Association:

"Another sin heaped upon pharmacy is the one of substitution. There is undoubted evidence that the practice does not exist among a certain class of druggists, and naturally, leaves the stigma upon the profession in general. This practice of dispensing another article than that called for cannot be too severely condemned—there is no excuse for it, and it is never justifiable. This very practice has given rise to the cutting evil, which has brought about a state of affairs unequaled in any mercantile calling. The ques-

tion of cutting prices enters into every mercantile transaction, owing to the great fight for existence, and to a certain extent druggists must come under the same influences that control every industry. But the cutting evil as it exists to-day among druggists, is not the result of true competition as found in other mercantile transactions, but a pretense to cover the unmercantile transaction, substitution.

"Statistics will show that whenever the practice has been one of legitimate cutting in prices, it has proven an extremely pound-foolish and penny-wise system; while, under the guise of cutting, substitution has produced a well-filled purse, branded with dishonesty, and has thrown disgrace upon the calling."

WHAT OUR CANADIAN CONFRERES THINK OF SUBSTITUTING.

Mr. Joseph Contant, the President of the Pharmacentical Association of the Province of Quebec, at the annual meeting, June 1, 1895, diplomatically said:

"I would have wished to say something about substitution, but I know that no pharmacist worthy of the name is guilty of this fault, by which he would lose his good reputation, and by which public confidence which he has till now enjoyed would be destroyed. I will not say anything about it."

DANGEROUS AND INNOCENT SUBSTITUTION.

The complications in our trade interests are, by a unanimous verdict of the aggrieved, laid at the doors of Substitution. You have heard what the practicing pharmacist has written in his address; you have heard what the manufacturer has said; you know what the nostrum vendor announces to the world; and you will soon hear what the physician publishes, whether exaggerated or not, on this popular theme.

I do not propose to defend substitution; I believe we are all agreed as to its cause and effect; but I have convictions as to its necessities in emergencies. There are two arguments possessing merit; one from a professional, and the other from a mercantile aspect. The professional plea is necessity: a special preparation is requested by the physician either personally or by prescription; such brand is not stocked, or it has been placed on the order list, the case is an urgent one, and the druggist discovers that he has a similar article in stock prepared by a reputable firm of manufacturing pharmacists, and suggests the same as being a remedy that will ensure equally effective results—a common practice nowadays. It is Hobson's choice with the physician, if present; but, in his absence, the pharmacist assumes the responsibility and furnishes what he has in stock. Now that is a case of permissible substitution, provided such articles cannot be obtained of a neighboring pharmacist, and yet the physician might demur; that is what I would define as emergency substitution, provided the article was unimportant from a physiological standpoint; but substitution can hardly be justified in toxicological mixtures, and in this fact lies the danger to both professions; for the constituents of the preparations, although similar in name, may differ in therapeutic action, in solubility and in posology.

The commercial argument interests us to a greater extent in a different direction. In these days when manufacturing pharmacists are posing as the promoters of New Remedies, inventors of New Therapeutic Combinations, and usurping the functions of post-graduate professors, they have through their enterprise created entirely new lines of preparations to such an extent that in future our pharmacopœial Committee will no longer be necessary; their occupation will evaporate; printers will weep, paper-makers grumble, wrangles among our professors disappear—our colleges will be filled with a corporal's guard of students, and we may well rouse our dormant gray matter and say, Where are pharmacy and medicine drifting?

These establishments have made a universal impression on the Pharmacy of all nations, and they are multiplying faster than the rabbits in Australia. In addition to this powerful element we must add wholesale druggists, who for their better security also become manufacturing pharmacists; and before another decade, if this annex in Pharmacy is not

discontinued and the pharmacist is not permitted to make his own preparations, every practicing pharmacist will be compelled to build a warehouse to store new lines in connection with his modest pharmacy, and this departure will require capital enough to establish a bank. If he can raise money enough to transact such a business on the scale required to be successful, my advice to him is to engage in any other occupation than that of a dispensing druggist, as he will be more prosperous, be able to become better acquainted with his family, will enjoy some of the amenities of life, can abandon an existence of commercial servitude, and need not become a willing slave to the responsibilities of his profession, by engaging himself to answer the beck and call of the public at all hours of the night at a compensation of ten cents on the dollar.

Now we come to the lacteal juice in the cocoanut—*why druggists are compelled through necessity to substitute.* Most of them are not capitalists, their means are limited, and to that extent they make their purchases. Many articles of daily utility are made by twenty or more firms; each genial and verbose representative of these rival concerns, understanding the weakness of the average physician, assures him that his firm is the best exponent of high art in modern pharmacy; in fact, many a physician has been led to prescribe an inferior remedy though the extravagant pretensions made for it. There are scores of such preparations prescribed in every city and hamlet in our country.

Now is it possible for the average druggist to carry twenty lines in the same category of manufactures? It is simply impossible. And right here I will come to the rescue of wholesale druggists when they practice substitution; it is no more possible for them to keep up these lines than it is for the retailer to keep twenty different makes of the same formula—here is where substitution gets in its deadly work. A's brand may be required on a recipe—the retailers may have B's or L's—same formula; in it goes; it happens to be a pharmacopœial combination—the physician learns of it—he objects because he prefers sugar-coated to licorice-coated or plain pills; the manufacturer learns of it and he favors the druggist with a lecture on Ethics; the druggist consoles himself, by "knowing his business:" he would be better satisfied if he prepared the articles himself, but he has no time—at least he states so—and he can buy the preparation so much more cheaply from the manufacturing pharmacist. This illustration still comes under the title of Emergency Substitution, and involves hundreds of pharmaceutical combinations.

Dangerous and unjustifiable substitution should never be countenanced where the equivalents are unknown; there are scores of excellent pharmaceutical preparations, compounded by educated pharmacists and physicians, which have won a reputation as specifics and which are prescribed on their merits; we have no right, moral or professional, to dispense in a prescription any other than the genuine preparation; we are often prevailed upon by some manufacturer's glib salesman to purchase some preparation purporting to be the same as the genuine, but such claim is undoubtedly fraudulent and we cannot afford to assume the risk. We step on dangerous ground when we lend ourselves to such practices, and legal entanglements may follow, an exposition of which would lower the tone of Pharmacy.

AN HONOR TO MANUFACTURING PHARMACISTS.

We are often prone to unjustly criticise our fellows among Manufacturing Pharmacists; we should feel proud of their splendid achievements. They have developed more for progressive Pharmacy than all our colleges combined. Where would Pharmacy have been twenty-five years ago had it not been for Parrish, Squibb, Procter, Ellis, Milhau, Delluc, Caswell, Hegeman, and many other honored names, most of whom made manufacturing for the medical profession a specialty. This roster, in our times, could be enriched by names that have given American Pharmacy a universal and imperishable fame. Standardization owes its great progress to members of our profession engaged in manufacturing pharmaceutical specialties. The medical fraternity has contributed little or nothing in this department of chemistry.

PROFESSIONAL USURPATION BY NOSTRUM VENDORS.

The usurpation of the prerogatives of the physician and pharmacist is creating consternation in both professions; as a matter of fact proprietors of advertised medicines, nostrum vendors and makers of non-secret preparations are practicing medicine without diplomas, some of whom with unparalleled effrontery are impeaching the skill of the physician, and are placing their compounds far above modern scientific therapeutics.

All attempts to silence through legislation an irresponsible class of these fakirs have thus far failed. The causes are obvious; two elements in the body politic "know their business;" annually or biennially, corrupt politicians frame a beneficent bill for the prevention and suppression of quackery, apparently drafted in the interest of the public welfare, compelling the owners of the advertised medicines that cure "all ills that flesh is heir to" to divulge their formulas, to have them analyzed, and print them on labels affixed to their packages; many other bills having the same object in view are termed in political parlance "a strike," which freely translated means revenue for scheming legislators; funds are freely contributed by interested parties or corporations to quash such bills. The quacks defraud the public by monstrous claims; conscienceless representatives of the people rob the quacks. Both contracting parties are satisfied—legislators are bribed—quackery continues—and the public are victimized in the conspiracy.

These unscrupulous humanitarians are responsible for precipitating our commercial war and collateral evils, and have the questionable honor of encouraging cut prices and also of being the authors of substitution in proprietary medicines. As a reward for their duplicity, like the eagle described by Aeschylus, they have been pierced with their own arrows; they have become so arrogant and powerful that they can muzzle the press of the United States, for scarcely a newspaper in the land will undertake to publish an article condeming quackery. Publishers are subsidized through their audacious and extravagant advertising, which brings rich spoils into the coffers; they wield an influence that is not to be underestimated with the press and legislation; we have often encountered it in our struggles for honest practice and protective laws. The same criticism can be fairly made against several over-enterprising pharmaceutical, medical and pharmoprico current Journals. If a firm refuses to patronize them liberally, they will publish insinuations, fabrications and libelous statements, reflecting on the business policy or preparations made by an un-blackmailable firm.

With a few conspicuous and rare exceptions, manufacturers of Patent Medicines buy the poorest quality of drugs and medicines attainable; and when they add new preparations to their list (usually furnished by manufacturing pharmacists, who place the art of pharmacy and science at the disposal of these quacks), they invariably want the lowest grade of goods at the cheapest price—that has been my personal experience with these adventuresome nabobs; but when I read their advertisements, being fully aware of the composition of the advertised articles, I am simply astounded at their sublime brazenness.

Many of these nostrums and advertised tonics are nothing more nor than less inferior synthetic liquor masquerading under a medicinal label, prepared for market for the purpose of circumventing prohibitory or local option liquor laws.

The prolix and cunning advertisement writers in their Literary Bureaus will make U. S. Ph. Compound Cathartic Pills or some equally commonplace prescriptions do wonders; with the pen they will make them cure Tuberculosis, Locomotor Ataxia, Nephritis, Chronic Endocarditis, Laryngitis, Calculi, Cirrhosis, Carcinoma, Paresis, and even grown a new femur, patella and fibula. With all our practical intelligence, we are the most easily humbugged and most gullible people on earth. The lectures delivered by the Indian Medicine man of Caucasian descent for the Kikapoo Indian Remedies, or by Professor Gall for his Stomach Rejuvenator, will hold audiences entranced and promote a successful business, whilst the educated physician is starving for want of patients. These adventurers should be prosecuted by our State and local Medical Boards for practicing medicine without a diploma.

Thus we must admit that the physician has grievances and has arguments with which to fortify his position when accused of dispensing on a free basis. Carefully inspect a catalogue of proprietary medicines and nostrums containing some two thousand preparations, and on investigation you will learn to your amazement that not over ten per cent. of all the medicines quoted are prepared by pharmacists.

On this subject Mr. Contant corroborates my convictions. He states in his annual address, previously quoted from, that "Patent medicines are a curse to the physician, the pharmacist, and the public. They are an unjust and direct opposition to the physician, by preventing the sick from obtaining proper advice; they deprive the pharmacist of the sale of his own preparations, and force him to keep in stock a large number of preparations which have only a limited sale; and they are injurious to the public, which, allowing itself to be cajoled by the certificates of cure, which are the complement of the advertisements, purchase the famous remedy, which often does more injury than good.

We should have in this country, as in most European countries, a commission composed of physicians and pharmacists. All demands for patents or copyrights for medical preparations should be submitted to this committee, with the formula, and after examination a report should be made to the government recommending or rejecting the demand. This would diminish the number of patent medicines, and the public would know that those, the sale of which was allowed, would be of a superior quality and incontestable value."

IS COMPROMISE A POSSIBILITY?

Advertised medicinal preparations have been the "bone of contention" for several years; we can now safely predict that their general sale (in another generation) will pass slowly into history.

Has the time passed for a compromise with the patent medicine man? I believe it has. Wherever advanced pharmacy is practiced the advertised medicine as a staple article must go. In large centres of population pharmacists will practice ultra pharmacy as much as possible, will prepare emergency household remedies under their own labels, and will sell as few advertised medicines as possible. In the smaller communities, and in country stores, so-called patent medicines and non-secret preparations will flourish like a green bay tree, until that stratum of society becomes wise enough to summon the physician and let him do the prescribing, with benefit to themselves, physically and financially. Prejudice is often deep rooted; intelligence and results are the great instructors in the march of modern progress.

COUNTER PRESCRIBING.

In regard to the accusation of counter prescribing by druggists, I prefer to submit you an extract from an address on this subject delivered by President Martin, of the British Pharmaceutical Conference in 1894:

"Chemists' prescribing is quite as loudly complained of by the doctors, and when I read some of the letters and comments which appear in the medical journals, I am almost tempted to fear that for once medicine is thinking more of its share of the pecuniary reward than caring for suffering humanity. There is, however, I am sorry to say, a great deal too much prescribing by chemists, and some of it is of a most reprehensible kind. I know a case where a chemist treated a man suffering from rodent ulcer of the face for two years, all the time buoying the man up with the hope that it was getting better, and that he would cure it, until the face was so bad, and the ulcer had spread to such an extent, that when it came under the notice of the surgeon nothing could be done for the patient. If that chemist had met the man upon the highway and robbed him, he would have been liable to imprisonment; but having got the man into his shop, he not only robbed him of his money, but rendered it impossible for the man ever again to be restored to health. For the dishonor which such men bring upon pharmacy, and for the

irreparable injury which they inflict upon suffering humanity, I should like to give them several years of penal servitude. But there are innumerable small accidents, and little ailments to which humanity is liable, which quite legitimately come within the province of pharmacy to treat, and the pharmacist if he is wise is a much safer man to treat these than the clergy and laity, who are ever ready to prescribe for each other upon any and all occasions. The best and wisest exponents of medicine admit this right on the part of pharmacy and welcome the service which is rendered by it to sufferers. Pharmacy may make some mistakes, but I know it frequently sends patients to medicine long before they or their friends would think seriously enough of the case to do so.

"There should be no rivalries or jealousies between medicine and pharmacy, and the better qualified each of these may be to exercise its own share of the duties devolving upon both, the more will each of them respect the rights and work of the other.

"One word on the principle upon which remuneration should be based. This is a question of utmost importance to the English public, as well as to the pharmacists. John Ruskin says, 'You do not pay judges large salaries because the same amount of work could not be purchased for a smaller sum, but that you may give them enough to render them superior to the temptation of selling justice.' We cannot err in applying this principle to pharmacy, and deciding that the dispensing chemist must be paid at a rate of remuneration which will enable him to get his living honestly and openly, and render him superior to the temptation to increase his profit and his income by tampering, in ever so small a degree, with the quality of the drugs he uses, and with the health, and maybe the lives of our dear ones, and of men important to the community. His remuneration should also enable him to devote sufficient time and care to every detail of his responsible work, and eliminate every real source of danger, which is unavoidable if the haste and bustle of trade methods are adopted by pharmacy."

His judgment is based on a more advanced state of pharmacy, since our British confreres have been practicing ultra pharmacy for many years.

The consideration of

ULTRA PHARMACY

is premature in this country, although there are isolated instances of its practice in our very large cities; we may be driven in the future to a choice in our practice, similar to that in Great Britain, where druggists are divided into two classes, namely, the chemist and druggist, who transacts a general business on a parallel with our practice of pharmacy, and the pharmaceutical chemist, who requires a higher qualification, and who professes to serve only the physician and make a specialty of prescriptions.

PHYSICIANS' ENDORSEMENTS.

The British physician is interested in the transpiring evolution between medicine and pharmacy, and is in evidence on the subject of our present craze. Doctor Woodhouse, in the "London Pharmaceutical Journal," writes:

"It is evident that there is much in the ethical aspects of the pharmacy of to-day that concerns medical men, and has important bearings on the practice of medicine. Pharmacy is undergoing considerable change, but in the midst of the healthy development there is a growth which, in excessive production and the tendency to invade all surrounding interests, is verily of the nature of a cancer. It is destroying the professional spirit in pharmacy. By means savoring of chicanery and advertisements, emulating, in a refined manner, the example of quacks, it is deceiving the public, and it has the effrontery to solicit the aid of medical men, by asking them to be the tooting agents for its goods."

PHYSICIANS PRACTICING PHARMACY.

We now come to the greatest surprise in modern times that the practice of pharmacy has ever experienced in the annals of this country. In our large centres of population,

enterprising manufacturing pharmacists, and physicians'-supply establishments, regardless of trade relations or ethics, furnish practicing physicians with ready-made medicines at, or near, lowest trade discounts, which are delivered to patients free of charge. We may now fairly propound the query, Where is the practice of medicine drifting ?

Were such an innvoation confined to isolated instances in large communities, the complaint would be too trivial for serious contemplation. But, fellow members, it is becoming general. Such complications augment themselves by neglect and accumulate momentum. I have had my attention drawn to physicians' address cards, which have printed below their address, "Medicine furnished gratis." Are you prepared for this new departure? If this contagious practice spreads itself over the nation, what will become of pharmacy? Shall we view two distinct forces (mercantile and professional) immolating our trade interests and chosen life-work, without remonstrance or justifiable antagonism?

The editor of a pretentious medical journal has attached such importance to the queries suggested to this Section, that he has reproduced them verbatim in his publication, and after some sarcastic allusions to the Chairman, writes editorially:

"We think the pharmaceutical profession is indeed in a bad way, if such topics have to be written about and discussed; and we might as well say now as any other time, that the doctor of the future will, in all probability, furnish his own medicine direct, because he has been driven to it by the sophistication, substitution, counter prescribing, adulteration, and extortion of the retail druggist. There is no mistake about it. The druggist might as well look the matter fairly in the face, for this is surely the end, and it is not very far off."

This criticism cannot represent self-respecting medical practitioners, but these views, nevertheless, foreshadow the trend of the times. Over-competition amongst physicians is the cause of the unnatural change. Answering his charges, personally, I denounce his statements as a libel on pharmacy.

Objection will never be made by our profession to supplying physicians through legitimate channels, in inaccessible locations or sections of our country where it would be impossible for a licensed pharmacist to gain a livelihood. But when a complete pharmaceutical armamentarium is furnished in communities where from one to a hundred graduates and licentiates of pharmacy, who have provided themselves with materials for the physicians' accommodation and necessities, are struggling for an existence, then we must "draw the line," and come to an understanding for the preservation of our mutual interests.

Should allopathic physicians persist in following the methods of their homeopathic brethren, we have our remedy; another year added to our college curriculum would finish our education solidly for the professions of medicine and pharmacy; we could then favor our medical friends with an answer to the address card previously mentioned, and have it read: "Medical advice free; we charge only for the medicine." What is sauce for the goose is sauce for the gander.

If we were forced into this position, provided with facts, I believe every State government would amend our college charters to include a full medical course, making it a four years' course, the same as in our most advanced medical colleges. We could easily complete this course and be better prepared than the average physician, on account of our previous practical training as pharmacists.

These reflections might lead to the assumption that we should spontaneously buckle on our armor, and declare war against the medical fraternity. Not so; let us call for an armistice. The interests of the physician and pharmacist are identical. We can ill afford to antagonize each other, and should strive to overcome our prejudices, and by peacefully adjusting our complications by joint conferences, secure mutual respect, harmony and contentment.

THE DEPARTMENT STORE

is a modern creation; it originated abroad. In Great Britain, it trades under the classification of co-operative stores, which are chartered as stock companies; and subscribers only are entitled to make purchases, though I am informed that the public are solicited through complimentary invitation. The policy of these stores is ostensibly to furnish all materials and wares, from a needle to an anchor, at cost, plus the expense of transacting business; when profits show a surplus, a dividend is declared for the benefit of the stockholders. Proprietary medicines are stocked and prescriptions are dispensed when compounded by a licentiate of pharmacy. Druggists and chemists are harassed by these establishments in the same manner as we are. If our brethren in Great Britain were organized they could dictate terms to manufacturers, but they lack unity; in France these stores are restricted from practicing pharmacy by Trade-Separation Acts.

As prognosticated in 1882, department stores are now offering household medicines and drugs under their own labels and trade-marks. These "grab-all" bazaars, if unmolested in their wild career, will send out skirmishers into every drug store and auction salesroom to buy up inert drugs and antiquated nostrums (the demand for which has ceased), and will offer in job lots, sarsaparilla, liniments, salves, plasters, pills and hair restorers, at bargain counter prices. As our pharmacy laws are now interpreted, through the elasticity secured them by statesmen, any livery stable, crockery store, cobbler or butcher shop can add a drug department annex to their establishment, provided a licentiate of pharmacy presides over its business.

Mr. Lascar recently made an analytical examination of several family medicines purchased at department stores, furnished them by manufacturers of non-secret remedies. We were not astonished to learn that adulterated medicines were sold under their own labels, at prices defying the competition of the pharmacist; further exposure will provide us with unanswerable arguments why the public should avert a common danger; vigilance on the part of our State committees on adulterations will compel legislatures to amend our pharmacy laws; and our representatives will finally appreciate and confirm our just claim to a separation of the practice of pharmacy from trade trickery; thus far, when pleading for further amendments, we have always been defeated by the agents of department stores; inferentially through bribery.

Several years ago a distinguished constitutional lawyer—a member of Congress for many years, and a prominent candidate for the Cabinet position of Attorney General—to whom I detailed our grievances and particularized the methods of the Department Store, gave me his opinion that we might demand a national law under the Inter-State Commerce Act; this would be the right procedure on the protective plea that adulterated medicines were being distributed in different States, and that it was in the interest of the public welfare of those States to prevent the sale of inferior drugs and medicinal preparations.

ALCOHOL.

The discussion of the question of free alcohol in medicine and the arts is of paramount concern to the drug trade; yet, in the absence of proper regulations and appropriation of funds with which to conduct this special service, it would be useless to give the subject serious consideration at present, though we may very properly pass resolutions defining our attitude regarding its effect on the drug trade as a whole, but not concerning any special branch of its interests.

From an impartial and judicial standpoint I cannot but consider the law discriminating in its effects, and particularly obnoxious to the professional and trade interests of Pharmacists, tending with great directness to force the Pharmacist into the ranks of *de facto* tradesmen; every druggist is held morally responsible for the quality of his preparations, which would be impossible if manufacturers alone could take advantage of the law as it

now stands on the statutes; the Galenicals would be furnished at a much lower cost, and the druggist's occupation would soon pass into history as that of a manufacturer, so that he would inductively be unentitled to any State protection, and this would openly invite tradesmen to become pharmacists; groups could be formed by wards in large cities at a small outlay to secure each druggist the rebate. While there are two sides to this question, yet from my examination of the advantages and injurious results, I would, as a practicing Pharmacist, decide against free alcohol in medicines. Therefore I most heartily endorse the sentiments of our Chicago brethren when they state "that the safety of the retail drug trade is in the unconditional repeal of the present law on free alcohol in medicines."

So far as the cry of cheap medicines for the people is considered, it is a delusion and a snare—the clap-trap of demagogues—and is one of those quadrennial humbugs perpetuated on unsuspecting voters. Free alcohol would be of inestimable benefit to wholesale liquor compounders, saloon-keepers, pharmaceutical "sample rooms," and so called "health lift" buffets. Its trivial cost in a prescription would make but a slight difference in price, yet the proprietary medicine man would give another banquet to celebrate his unalloyed joy at such a windfall, for the price of his preparations would remain unaltered.

While I clearly see the weaknesses that slumber in the bill, I also perceive some strength. It would give our great chemists a favorable chance for the trade of the world, and would add a new column to our vast exports, besides warming the hearts of corn, wheat and potato farmers. You must remember that Great Britain and Germany have encouraged their manufacturers to extend their operations into foreign markets by giving them free alcohol for export. Free alcohol employed as a constituent in preparations for export, and the arts, would endanger no home industry or interest—the rebate would undoubtedly be considered in the price made in order to secure foreign business, consequently the manufacturer would receive merely a reasonable profit, the same as enjoyed by his foreign competitor.

Lastly, we need revenue, and the tax on Alcohol as at present regulated is easily collected by the Governmant at low temperature rates.

RELATION OF THE PHARMACIST TO THE PUBLIC.

The responsibility of the Pharmacist as comprehended by the public is published in truthful simplicity by a layman in the Cincinnati Journal Messenger, and worthy of reproduction: it reads as follows:

"*As the Public view Us—the Retailer Responsible.*"

"Some of the druggists who have been caught selling adulterated goods are very bitter on the Food Commissioner of Ohio. They say they cannot stop to analyze everything they sell; that they purchase their goods in good faith and sell them as they buy them. But if the druggist cannot distinguish adulteration, how is the inexperienced consumer to do so? And why does not the druggist buy of a manufacturer who will guarantee the goods to be pure? Or, if fined, why not prosecute the manufacturer who sells? There is probably no difficulty in purchasing pure goods if the retailer really desires to do so. He buys adulterated goods because he gets them more cheaply. The public must look to the retailer. *It is his business to know that his goods are pure, and he must be held responsible for their quality.* It is for him to deal with the jobber or manufacturer."

THE DUTIES OF EMPLOYEES.

The continuous reduction of incomes in cutting localities has had its effect on wages; as a sequence, our licensed drug clerks receive the lowest compensation paid by any profession. With an improvement in trade interests, employers will be encouraged to favor them with increased salaries; our interests are their interests, and they should enlist in our ranks and assist us in putting our opponents into their legitimate spheres.

MODERN PROTECTIVE PLANS.

The Universal Trade Association of Detroit, while I know little of its antecedents, may be managed and promoted by men governed by honorable motives; no one can wish them success with greater sincerity than I; but its future is, in my opinion, extremely doubtful, on the ground that the plan is impracticable; yet they can do a great service in the work of organization if the subscriber has faith in it.

Retailers are over-anxious to secure relief, and at the present time will give their adherence to any plan that offers hope. Those who do not join the Association will be fashionable and exercise the privilege of under-selling prices, thus giving them an undue advantage over the members of the Universal Trade Association; yet we must not disregard the fact that the most impartial critics have no confidence in an overwhelming majority of manufacturers of advertised medicines that acquiesce in any plan and violate their contracts *ad libitum*.

It is absurd to expect 75 per cent. of a total to succeed in any cause. Less than five per cent. will defeat any plan. In large cities we must organize 95 per cent. of a whole; this proportion will compel 5 per cent. or less to listen attentively to any reasonable demand, especially if the 95 per cent. carry into execution their mutual moral obligations.

The Grocers' Protective Plan, recently endorsed by the Proprietary Medicine Committee of the National Wholesale Druggists' Association, with its penalty attachments, may be a source of protection to the wholesaler, but as usual the retailer is ignored in the plan. My judgment is and always has been and always will be that any plan to be successful must have as a pivotal consideration the absolute protection of the retailer, based on thorough organization.

In so far as any protection is to be secured from the manufacturers of so-called patent medicines, Mr. Kline in the conference stated:

"*It will be observed that this plan* (referring to the Grocers' plan) *does away with cut-off lists. The committee confess the fact that the present system calling for refusal of orders by proprietors from parties found to violate agreements is practically inoperative and cannot be maintained.*"

So much for modern protective plans.

RESOLUTIONS.

It was my intention to offer resolutions on the following pertinent subjects:

"The Relations of the Wholesaler and Retailer."

"On Proprietary Medicines, Nostrums, and Non-Secret Preparations."

"Local County and State Organization."

"The Adjustment of the Professional and Commercial Relations between Physician and Pharmacist."

"Conference Committees to meet with Local, County and State Medical Societies."

"Organization of State Committees on Trade Interests into a National Committee connected with this Section."

"Department Stores and Adulterated Medicines."

"State Legislation to restrict Pharmacy exclusively to Graduates and Licentiates of Pharmacy;" and

"On Substitution."

The gravity of the situation and the national importance of these vital topics impel me to recommend you to appoint a Special Conference Committee on Resolutions, consisting of nine active members representing important sections of the country, to draft these or other appropriate resolutions, and submit them at a subsequent session for approval.

I furthermore recommend the following Committees, in order to render more valuable the possibilities of this Section: A Committee on Local, County and State Organization, to report annually the progress made by the several States; one on Proprietary Medicines,

to favor us with a report of the condition of this distracting traffic; one on States Trade Interests, to give us a consensus of their judgment on national affairs, by State reports condensed into a general report; a Committee on "Pharmaceutical Preparations," and a Nominating Committee, to be composed of one member from each State present at the annual meeting, to elect a Chairman, Secretary and an Executive Committee.

Epitomizing the situation, implicating as it does every branch of our professional and mercantile transactions, I have reviewed these grievances and complications for the purpose of arriving at their collective effect; we are surrounded by progressive evils which no one can deny, that by further evolution will have the destructive grip of an octopus on our varied interests; out of this labyrinth we must extricate ourselves from an impending crisis.

We do not advocate dismemberment, chaos, or retaliation; if we err in our remedies let us embrace optimistic, rather than pessimistic resolutions; but, in order to secure a well defined recognition of our professional and mercantile rights and the emancipation of our brethren in the rebellious centres, we must act in the most aggressive manner, and with an unyielding loyalty, in defending our mutual interests. How can we, at present, regain harmony and prosperity without suggesting radical measures?

FIRST: SETTLE THIS QUESTION OF SUBSTITUTION.

This is, as already stated, a casuistical question; it is also the most important and dangerous question of the day; it is a revolutionizing factor in our professional and mercantile affairs, since it involves the physician, pharmacist, manufacturing pharmacist, wholesale druggist, manufacturer of proprietary medicines, so-called patent medicines and nostrums, as well as the public. When we have judicially settled this question—and it must be settled, morally or legally—then more than one-half of our battle will have been won.

SECOND: ORGANIZATION.

Let us organize in every hamlet, village, town, city, county, and state in our Union; and finally, nationally by States; compact union means victory, for every reasonable demand made for more stringent pharmacy laws or for more justifiable mercantile protection. All for one, one for all, should be our tocsin. Under aggressive yet conservative national leadership, organized by States, we shall, depend upon it, be magnificently prepared for the protection of the practice of pharmacy against adulterated drugs and medicines, quackery and department stores.

THIRD: MANUFACTURERS OF PROPRIETARY MEDICINES

must choose their distributors, or their preparations will be discriminated against in every city and hamlet in the United States; they possess the power to protect their interests, if they choose to exercise it honorably.

With the settlement of these three propositions, 90 per cent. of our evils will pass away. Our relations with the physicians can be adjusted in the State, County and Local Conferences. Wholesale druggists are sometimes over-shrewd, but they understand where their interests lie, especially when you act in unison and enforce moral penalties. But, fellow members, the alkaloids of success are Organization, Loyalty to our Fraternity, and Honesty in our chosen profession. The power in this Trinity is crystallized in Unity.

I hope you will pardon me for having introduced personal reminiscences. In the past I have been charged with writing and delivering inflammatory speeches in defense of our professional, legislative and commercial interests. I do not deny the accusation. I have often wished I could ignite a similar flame in your minds, and possessed the gifts of Demosthenes. My convictions of years ago you were unprepared for; yet I have never hesitated to nurse those embryo conceptions, and clung to them until they ma-

tured. The consolation remains, that, by their constant agitation, we have secured pharmacy laws in nearly every State in our Union, better equipped colleges, and we are receiving a higher pharmaceutical education. Brave men everywhere have aided in these reforms, and to-day we can feel justly proud of the work accomplished by enthusiasts.

All great reforms for the general benefit of mankind have had zealous, energetic men as champions, who were actuated by pure motives. For years they were in a minority, before their objects were accomplished. Our first attempt, in 1882, was not without its lessons and triumphs. There are pharmacists in thousands of villages, towns, small cities, and a few large cities to-day successfully practicing pharmacy, that have achieved their freedom from disastrous commercial evils through complete organization and unity, and this work is progressing continually outside of the cutting centres, which proves that a remunerative basis can be restored by fraternal conferences. Recently, a committee on trade interests, appointed by the Kentucky Pharmaceutical Association, visited Lexington, and settled an acrimonious cut-rate war to the entire satisfaction of those engaged in the conflict. Right here allow me to congratulate the pharmacists of Illinois and their leaders for the splendid triumph obtained by them in restricting pharmacy to its legitimate exponents. This evidently was the result of intelligent leadership founded on thorough organization. The introduction of similar methods will succeed in any section of the country, but we must first organize.

Join your local association.

Join your county organization.

Join your State society.

Join your national guild.

The power that rests in complete organization is an irresistable force—a bulwark of defense as well as of protection. It is recognized in every branch of human activity; it has won struggles in Sociology, Science, the Professions, in Commerce, indeed in every direction that has tended to make life more bearable; even the most uncompromisingly stern and unpoetic, hard, matter-of-fact individuals are persuaded into associations that are formed for their own advancement and benefit. Pessimists believe we are living in an age of popular madness and degeneracy, and consequently, society must organize itself for self-preservation. A high order of intelligence should respond quickly to a common danger.

We do not expect the untutored and lowly to respond with the swiftness of a Mercurius in conserving their rights or material interests; yet passing events chronicle the fact that they bravely rise "en masse," oppose oppressing conditions, and never cease until their agitation is crowned with success—won entirely through unity of action, and purpose; they act, while we slumber and dream over our tribulations. We are not bereft of those characteristics which others employ with such vigor and pertinacity; they are a part of our common inheritance; we are simply unsympathetic, too lethargic and insufficiently organized to contend for our own interests.

The present emergency is even greater than the previous one of 1882; I, for one, propose to stand by my convictions and colors and fight it out with the old lines of "no surrender." We must win in this struggle, or pharmacy as a profession is doomed or demoralized; the onward path is not strewn with roses, the strife demands all the cohesive power we possess. To overcome our opponents in and out of the profession, we must summon into our ranks every pharmacist, whether affected or unaffected in his trade interests. There must be no hesitation, no wavering, no delay. There is no other course to pursue. Let us arouse from our stupor, organize our forces into a solid phalanx, and march forward to victory.

THE SECRETARY: Gentlemen, you have heard the Chairman's Address. What will you do with it?

Mr. Mayo moved that the address be referred to a committee of three appointed by the Chair, to be reported on at the next session of the Section.

The Chair appointed as such committee, Messrs. Holmes, Wooten and McDonald.

The Secretary read an announcement that the Broadway Theatre would be open for the inspection of visiting pharmacists immediately after the adjournment of this session.

Upon motion, the Section then adjourned until 8 : 30 of the same day.

Tenth Session—Thursday Evening, August 15.

The Section was called to order by Chairman Seabury, and after the reading and approval of the minutes of the preceding session, the committee appointed on the Chairman's Address reported as follows :

To the Commercial Section.—Your Committee, to whom was referred the Chairman's address, regret that, in the extremely brief time allotted for the consideration of such an exhaustive and comprehensive document, it was impossible to adequately consider even the recommendations it contains. While the committee believe that pertinent resolutions might be offered on the various topics suggested, the framing of suitable and potent resolutions must be delegated to the members on the floor. We present, however, the following resolutions, and recommend their consideration :

1. That a National Committee on trade interests and local organization be appointed, to consist of three members from this Section and of the chairmen of the committees of the State associations of each State, upon trade interests, for the purpose of making such recommendations as they may deem best to aid in the regulation of the commercial aspects of pharmacy.

2. That a committee be appointed on proprietary articles and pharmaceutical products, to consist of five members, to be appointed to investigate and report upon the traffic in proprietary preparations, on substitution and other evils, and to recommend steps to alleviate them.

3. That a special conference committee, consisting of nine members, be appointed to draft suitable resolutions in relation to local interests, and report same at the next meeting.

Aggressive measures, as suggested in the address, seem necessary in order to correct the present trade conditions, but your committee deem it expedient to refer the matter directly to the members of the Section for consideration.

Respectfully submitted,

Clay W. Holmes,
Thomas V. Wooten,
Geo. McDonald,
Committee.

Upon motion of Mr. Ryan, the resolutions embodied in the report of the committee were considered *seriatim*.

The Secretary read the first resolution.

Mr. Good : The chairmen of these committees in the State Pharmaceutical Associations are likely not to be members of this Association, and I do not think that we can

put upon an official committee of this Section a party who is not a member of the Association.

MR. HOLMES: This question was raised in the appointment in the New York State Association of a committee which was quite analogous to this committee; the object of the committee being to secure, if possible, a report of the condition of trade in each county of the State; and as there were not members of the Association from each county, it became necessary for the Association to appoint the best person from counties not having members in the Association. The province of these State members of the committee is to furnish complete reports of the trade interests of their locality; then the committee of three from this Section take those several reports, and from them, in a condensed form, make a report of the condition of trade throughout the country. This is the idea involved in the recommendation of the Chairman. It seemed to your committee a good one, and, therefore, in order to accomplish it we tendered that resolution, the only way, it seemed to us, in which it could be accomplished.

MR. ALPERS: I believe that the committee did not look into the matter thoroughly, or this resolution could hardly have been offered. In the first place, what right have we to appoint on one of our committees a man who is not a member of our Association? It seems to me improper that we should pick out forty-six men from all over the United States, and ask them to act as a committee in our body. What guaranty have we that they will act? We have had some experience in inviting state organizations to act in harmony with us. It has happened at various times that they have been asked to report on some matters, as, for instance, on the question of apprenticeship. We learned from the Permanent Secretary's report yesterday that out of thirty state organizations called upon only five responded. Now, what right have we to expect that the chairmen of these trade interest committees, who are not members of the Association, would respond? Furthermore, has this committee ascertained that all these associations have trade interest committees? I do not know that they have. What guaranty have we that they have? Some may have such a committee, and some may not. Certainly the composition of this committee is very ill-advised, in my mind, and I do not think we ought to take any action on the selection of a committee, in that way. If we want a committee, let us select it from our own members.

MR. WATSON: I thoroughly agree with Mr. Alpers. I do not believe that we have the right to appoint as a member of this committee a man who is not a member of the Association; and I therefore move to amend that section of the resolution so as to read, "one member of this Association from each State be appointed to constitute that committee." In doing that it would naturally be supposed that the Chairman of this Section, who appoints that committee, will select some representative man of the State, who would be supposed to know the status of the trade interests of his State, and would take an interest in the work of this committee.

The amendment was seconded.

MR. HALLBERG: Whenever there is any proposition made in this Association to do some work which would demonstrate that this is really an *American* Pharmaceutical Association, there is always some objection of this kind made. Now, it seems to me that the proper way to extend the usefulness and popularity of this American Pharmaceutical Association is to present it in such a way throughout North America that the men of the various States who are interested in special subjects will practically be forced to become members of this Association. I see no reason under the constitution or by-laws why these men cannot be selected, or cannot, at least, be asked to act as members of this

committee. The President or Chairman of this Section is not in a position to select the proper kind of men from the various States. The different State associations usually select the proper men for such a position as Chairmen of their Trade Interests Committees, and they are pre-eminently the men who have watched these matters for the purpose of reporting at their State meetings; and if they are not members of the American Pharmaceutical Association, then the fact that they have been appointed on this national committee would, I think, practically compel them to join the Association. I have always favored a plan of organization of this kind, and I do not think we ought to hesitate about appointing men simply because they do not happen to be members of this Association at the particular time that they are appointed. I therefore favor the original resolution.

MR. KUHN: I think that the last speaker is exactly right, and therefore I hope that the amendment will be voted down and the original resolution carried.

MR. WATSON: In the first place, I for one, as a member of this Association, do not want to force any man to become a member of it. If he does not want to become a member voluntarily, I would rather he would stay out. Another point that suggests itself to my mind is this: that in appointing these members probably we do not know whom we are appointing. For instance, our Association is in session now; some of the State Associations have met and appointed their committees, and they will meet again probably just a week or two before our next meeting, and in the meantime the gentlemen who are chairmen of the Trade Interests Committees now may cease to be such, and new men be put in their places. It is altogether impracticable for the Association to appoint anybody on its committees who are not members of the Association.

MR. GOOD: I agree that Mr. Hallberg is sentimentally right, but he is technically wrong.

THE CHAIRMAN: I dislike to take up much of your time, on the ground that it has already been trespassed upon. The recommendation was not made without thought. The object of making it a committee of five was to form a nucleus first and then it would spread to State organization. That was in my mind, without attempting to give you that in 1895, on the ground that if you attempted to get too much work on this Section at once the chances were that very little would be accomplished, judging by past experience. At the same time, in reporting on my address I think the committee overlooked a most prominent feature of it, and I believe that they have made amends in the form of a resolution. I simply wish to defend myself on that point. I have not attempted this work in any hap-hazard way. I agree with Mr. Watson on the generalties, in the way of the appointment from a national standpoint, which I anticipated, but not at this meeting. I do not think we are ripe for it. I think at the next meeting our Committee on Trade Interests would recommend that, and we would probably so construct our recommendations that the President of each State Association would make it his pleasure to appoint each year a member of this special committee. That applies to the other committees which the chair has recommended.

MR. HOLMES: Under the suggestion which you offer, if my associates on the committee are agreed, I would like to suggest as a substitute that the president of each state pharmaceutical association appoint a member of this committee, who shall be a member of the American Pharmaceutical Association. That will cover the entire ground, and accomplish, I think, the same purpose.

The other members of the committee signified their acceptance of the amendment.

DR. WHELPLEY: I trust the committee will further amend this resolution by including a member from each state and territorial pharmaceutical association, and the provincial pharmaceutical associations of Canada.

The suggestion was accepted by the committee, and the question being put upon the adoption of the resolution as amended was carried, the resolution reading as follows:

Resolved, That a National Committee on Trade Interests and Local Organization be created; the committee to consist of three members from this Section, and one from each state and territorial pharmaceutical association and the provincial associations of Canada; said committeemen to be members of the American Pharmaceutical Association, and appointed by the presidents of the various associations aforesaid. This committee shall report annually in a condensed form the condition of trade throughout the country, and upon any other pertinent subjects, making such recommendations as are deemed necessary.

The second resolution presented by the committee was then taken up:

Resolved, That a Committee on Proprietary Articles and Pharmaceutical Products be created; this committee to consist of five members. The duties of this committee shall be to report annually upon the condition of proprietary traffic, substitution and other existing evils, and to make recommendations as to the best methods of correcting them.

Upon motion, this resolution was adopted as read, and the report of the committee as a whole adopted as amended.

The Secretary read the third resolution presented, reading:

Resolved, That a committee, consisting of nine members, be appointed as a Special Conference Committee on Resolutions, to draft any appropriate resolutions on pertinent subjects and submit them at the next session.

The resolution was adopted, and the Chair appointed as such committee Messrs. J. M. Hurty, Indiana; Clay W. Holmes, New York; John F. Patton, Pennsylvania; L. F. Chalin, Louisiana; E. E. Quandt, Maryland; Thomas F. Wooten, Illinois; Geo. H. Hechler, Ohio; and Paul G. Schuh, Illinois.

THE CHAIRMAN: The report of the committee having been disposed of, we will now have read such papers as have been presented to us. In the absence of the committee, we have concluded to allow these papers to be read without prejudice, and it will devolve upon the Executive Committee to decide whether they shall be published or not, for the reason that we are unable to come to any agreement now on account of the absence of the committee. This Section will always give fair play to every one, and if a paper is read that our members have any objection to, why, they have the floor where they can relieve their minds. Speakers will be allowed five minutes, outside of those who read the papers, and no speaker shall speak twice until the first edition has been exhausted. (Applause.) We have a paper here from Mr. Girling, of Louisiana, entitled, The Patent Medicine Evil. The Secretary will read the paper, in the absence of any member from Louisiana.

Mr. Hallberg moved that the paper be referred to the Executive Committee.

Seconded.

MR. EBERT: This paper makes suggestions in reference to legislation which, like many other suggestions, are not practical. To secure legislation which will control the proprietary medicines of this country, and compel them to publish their formulas, is not possible in any State of this Union. The patent medicine interest of this country has power which the retail druggists of the country are not able to overcome by such legislation. I will tell you how it was done in the State of Illinois, and how we have accomplished the very object that this writer wishes to secure. We have just amended the Pharmacy Law of the State of Illinois in the following manner: First, no one but a registered pharmacist shall open or conduct a drug store; second, all drugs, medicines and poisons shall be sold in a store conducted by a registered pharmacist; third, the name of the registered pharmacist shall be over the door, or over the department, where such drugs, medicines or poisons are sold; fourth, all drugs, medicines or poisons that are sold must bear the name of the registered pharmacist and his address. Now, if a patent or proprietary remedy is a drug, medicine or poison, it can only be sold by a registered pharmacist, in a store conducted by a registered pharmacist—the registered pharmacist's name must be attached to all drugs, medicines or poisons that are sold. The amendments to the law were passed by the State Legislature against all of the opposition that the patent medicine interest could bring to bear, and even that of the medical profession, who did not wish to have patent medicines recognized—against this opposition that we had to confront we passed it in the Senate with but four, and in the House with but nine votes against it, and although the Governor did not sign the bill, for the reason that there had been such opposition, the bill has become a law.

To regulate the selling of proprietary medicines by department stores, we have a clause in the law providing that apprentices in a drug store must be registered by the State Board of Pharmacy, so that they cannot employ girls. Another feature is that nothing in the law shall interfere with the exclusive wholesale business of the wholesale druggist. We have a great deal of competition from the wholesaler who retails in large cities. The wholesale druggist in the State of Illinois, from this time on, will not be allowed to retail. (Applause.)

Dr. Stewart here read a paper in answer to Queries No. 8 and No. 9, as follows:

"QUERY NO. 8. Are non-secret preparations in imitation of well known domestic medicines a legitimate product; and is it honest for a dealer to allow his name to be printed on the label so as to give an unknown compound currency, when he is ignorant of the contents of such preparation?"

"QUERY NO. 9. Does not the pharmacist jeopardize his reputation and standing by dealing in non-secrets, when he possesses the knowledge of compounding as good or better formulas?"

The way these questions are put is very misleading. In fact, several questions are compounded together and worded in such a manner that an attempt to answer them as they read, either in the affirmative or negative, is impossible without separating them from each other. On analysis it is evident that the following questions are intended; (1) Are non-secret

preparations a legitimate product? (2) Is it right for a druggist to sell imitations of the goods of others? (3) Is it honest for a dealer to allow his name to be printed on the label of goods that he does not manufacture himself? (4) Is it right for a druggist to give an unknown compound currency? (5) Does not the pharmacist jeopardize his reputation and standing by dealing in goods which he does not make himself, when he sells the same under his own label? (6) Does he not injure his reputation and standing by selling any article that he can make as well or better?

It is almost self-evident that a druggist should manufacture and sell his own preparations rather than the preparations of others if he has the facilities and capital for so doing, and can make sufficient margin of profit to afford him a livelihood. If the pharmacist had the power of so controlling the market that no one should demand any other goods except what he chose to sell them, it might be practical to manufacture his own preparations as a rule. He is, however, forced to supply the demands of physicians and of the public, and to a great extent sell what they ask for. He therefore handles a good many things that he would prefer not to sell. He is ignorant of the contents of proprietary medicines, including "well-known domestic medicines" of a proprietary nature. His reputation with the public is not founded on his skill in manufacturing, but on his ability to supply the demands of his customers. To a great extent the same principle applies to his relations with the medical profession, as physicians believe that as a rule the large manufacturing houses have better facilities for selecting drugs and preparing medicines than the retail druggists, although the latter may "possess the knowledge of compounding as good or better formulæ." If it were in his power he should never give an unknown compound currency, but unfortunately that power does not belong to him. The question then is, should he ever permit his name to be placed on the labels of goods he does not manufacture himself? In other words, should he dispense bicarbonate of soda, paregoric, belladonna plasters, or any other medicine for internal or external use under his own label unless he is the manufacturer of the same? These questions might be all answered with yes or no without touching the great principle that underlies the question of non-secret medicines. To this principle I now wish to call your attention.

It seems to me that the fact that no one should prescribe or dispense medicines unless qualified by education and experience to do so, is indisputable.

The application of this rule would limit the prescribing and dispensing of medicines to physicians and pharmacists, would stop the manufacture of so-called patent medicines and nostrums of all kinds, and send the people to the doctors for prescriptions to be dispensed by the apothecary.

This rule is all well enough on paper, but it never will be practical until the public is educated to the high standard demanded for its application.

Until that time, the public will continue to dose itself with drugs, physicians and pharmacists to the contrary notwithstanding. It is expedient, therefore, under the existing circumstances, to supply this demand for household remedies.

Several questions naturally present themselves in this connection: (1) How can the public be so educated that it will realize the folly of self-medication, and delegate the prescribing and dispensing of medicines to those who are qualified for this important work; (2) During the interim, what medicines should be employed by the public?

There are at present four classes of medicines in use: (1) Pharmaceutical preparations, namely, those whose working formulas are published, so that any pharmacist can make them. This class is illustrated by the tinctures, fluid extracts, etc., of the United States Pharmacopœia. Such preparations are free to the use of all, being unprotected by patents, trade-marks, or copyrights. Their names are compatible with scientific nomenclature, and they are already in the United States Pharmacopœia, or in similar works, or are fit for such insertion. (2) Proprietary medicines advertised to the medical profession. This class of medicines are secret, or semi-secret in their nature, their true or working formulas never being published, and their names usually being registered as trade-marks in the Patent Office at Washington. (3) Proprietary medicines advertised to the laity. The nature of this class of preparations is usually more secret, and they are protected by the same method as the former. These two classes of preparations insensibly merge into each other, for many of the latter commenced their career in the rank of the former, being first advertised to the medical profession, and then, after securing professional endorsement, being advertised to the laity. (4) Non-secret preparations, a class of medicines which has come into vogue during the last fifteen or twenty years. This class of preparations as originally introduced, bears the correct formulas on the labels. They are made by the large manufacturing houses in quantities, and generally are sold under the labels of the retail druggists who purchase them. They are not advertised, and no attempt is made to create an artificial demand for them by claiming marvelous virtues not in fact possessed.

Another class of preparations might be added to this list, namely, patented medicines. The name "patent medicines," as usually applied, is a misnomer. The patent law requires the publication of the exact knowledge of each invention, and limits the protection to a certain number of years, after which the article becomes public property, and may be sold by every one under the name by which it was first introduced. Medicines are so rarely patented, however, that this class does not in fact exist. Even when a patent is granted for a medicine its name is usually registered as a trade-mark in addition, which defeats the object of the Patent Law.

The objection to the Proprietary System is that it is a system of per-

petual monopoly and secrecy. It is diametrically opposed to the Patent Law, which was designed to promote progress in science and the useful arts by securing the publication of inventions and by throwing them open to competition after the expiration of the patents.

The question now arises, which of these classes of medicines the public should employ? The class pharmaceutical preparations is too narrow to supply the demand. Furthermore, the pharmaceutical field has been, to a great extent, absorbed by the proprietary medicine manufacturers, who very naturally desire to occupy it entirely and shove everything else overboard. This may be all well enough for the manufacturing houses, but it is hard for the retail druggists, who are being shoved to the wall; and the Proprietary Medicine trade has now become a menace to the medical profession itself. Worst of all, it is a serious menace to the public, for people at large are not sufficiently educated in matters medical to discriminate between reputable medicine and the nostrum traffic, and waste time dosing with patent medicines instead of sending for the doctors. I admit that a large number of the proprietary medicines which are advertised to the medical profession, and to the laity as well, are beyond all reproach as far as quality of drug, care in manipulation and medicinal activity are concerned. The danger to be apprehended from them is the same that might be apprehended from a finely-tempered razor when placed in the hands of a little child. The public is not sufficiently educated to be its own physician.

Taking all things into consideration, if the public is to dose itself at all, non-secret preparations, the true formulas of which are published on the labels, would seem preferable to secret or semi-secret proprietary compounds, advertised to cure nearly all the ills that flesh is heir to. Every effort is made by the manufacturers of many of these compounds, especially those advertised to the laity, to create an artificial demand by publishing cures only, and sometimes by deliberately coining testimonials from physicians, clergymen and others, attesting to the efficacy of their alleged remedies.

Those who will accept my verdict in behalf of non-secret medicines, instead of secret or semi-secret proprietary remedies, will probably meet me with the argument that every druggist should manufacture his own non-secret medicines. Theoretically this is true, but, like a great many other theories, when put into practice it is not always practical. While advising every druggist to manufacture his own non-secret medicines on general principles, we have no right to say that he must do so whether he likes or not. The question is one for him to settle himself. If he can have his non-secret medicines made for him by first-class manufacturing houses cheaper than he can make them himself, we certainly have no right to seek to compel him to do his own manufacturing at a pecuniary loss.

I am not here to advocate trade piracy. I have no use for those parasites who steal other men's reputations by imitating their goods. Counterfeiting is a crime which all honest men detest. But the argument of the proprietary medicine men in this connection is fallacious in the extreme. The assumption that the introducer of a new compound thereby acquires a perpetual right to its manufacture and sale is utterly absurd. As well might the inventor of the sewing machine seek to monopolize the entire sewing machine business of the world for all time because he introduced the sewing machine. A strict application of the rule will show its absurdity: suppose for example, that the inventors of pens, ink, paper, linen cloth, silk fabrics, pins, needles, and every other invention, should have been permitted to carry out the same rule. What would have been the result? It is easy to see that in course of time an aristocracy of inventors would have been created, owning all the property in the world, and the rest of mankind would have been grovelling in abject slavery. Either this, or the rest of mankind, being in the majority, would have arisen in their wrath and put an end to such an atrocious system of monopoly. This is precisely the kind of system the proprietary medicine people are attempting to ram down the throats of the retail druggists of this country. I read recently in "Printer's Ink" that "The Proprietors of Castoria, Syrup of Figs, Ayer's Sarsaparilla, Paine's Celery Compound, Hood's Sarsaparilla, and Carter's Little Liver Pills, have banded together to protect their trade from piracy and plunder." In other words, these concerns have banded together to perpetuate a monopoly of their products for all time, contrary to the very spirit of the Constitution of the United States. The Constitution is opposed to such monopolies, but grants to inventors a monopoly of their inventions for limited times, in exchange for the publication of exact knowledge concerning them, whereby the public may use them freely as articles of manufacture and commerce, when the patents expire.

What are these valuable compounds which the proprietary manufacturers are seeking to monopolize in this way? Quoting again from (ostensibly) their organ, "Printer's Ink:" "All these formulas are nothing more than good prescriptions given by prominent physicians and put up under fanciful names, and they possess genuine merit." This is a remarkable confession. They own that they did not invent these compounds, but are trading in prescriptions of physicians to which they have no exclusive right. It is apparent, therefore, that the rewards given by the Government to inventors do not properly belong to them. They must admit that any druggist has a right to manufacture and sell the same compounds. Admitting this, they will probably claim that others have not the right to make and sell these compounds under the fanciful names given them by the proprietary manufacturing houses. Even this is very doubtful. Fanciful names become descriptive by use, and it is an axiom in law that a descriptive name can-

not be a trade-mark. Moreover this use of fanciful names defeats the very end of the Patent Law, because it offers a method of protection perpetual in character and without the publication of full knowledge of inventions, as demanded by the Patent Law.

Time will not permit me to go off on a further tangent in relation to the Proprietary System, but I am prepared to prove that the whole system is unconstitutional, unscientific, and, therefore, unethical. I can cite a great many cases which have been decided by the courts, both in this country and Great Britain, to prove it, and I am prepared to assert that the Proprietary Trade is more responsible than anything else for the ruination of the retail drug business, and for driving physicians to dispensing their own medicines as a method of self-protection.

Let me read to you what the House Committee on Patents of the United States Congress said in answer to a petition submitted to that body by the Delaware Pharmaceutical Society in 1890. The memorial read as follows:

"We, the Delaware Pharmaceutical Society, crave the attention of your honorable body to a system of perpetual patent, which has grown up in our midst and has become a hardship to the druggists of these United States, for by it medical and pharmaceutical inventions are restrained from general use indefinitely; the manufacture and sale of medicinal preparations are rapidly passing into the hands of irresponsible manufacturers, merchants and tradesmen, and the pharmacists of these United States are continually menaced with threatening letters, enjoinders and lawsuits by the monopolists.

"Our investigation of this system leads us to believe that it is an abuse of the patent and trade-mark laws, and contrary to the Constitution of these United States. The latter gives Congress the power to promote progress in science and the useful arts by securing to inventors for limited times the exclusive use of their inventions; while the proprietary system includes the use of the only names by which inventions are known to the public as trade-marks, and thus establishes perpetual monopolies, which are a hindrance to all progress, and injurious to commerce. The patent law requires a publication of full knowledge of inventions, whereby the public may manufacture the same when the patents expire. To this the proprietary system is opposed, for it not only restricts the use of inventions for an indefinite time, but creates monopolies without protecting science and the public welfare by such publication. And the trade-mark law was not intended for the purpose of creating monopolies, as it certainly does, if inventors are allowed to retain the only names by which their inventions are known as trademarks, thus cutting off the public from making and selling inventions under their proper names. This use of the trademark defeats the end for which the patent law was devised, and sets up in its place a system opposed in every particular to the principles upon which it is founded.

"As there seems to be a great deal of misunderstanding concerning the application of the laws referred to, judging from the decisions of the courts, which are at variance with each other, we, the Pharmaceutical Society of Delaware, would respectfully appeal to Congress for an interpretation of the law, more especially as it relates to trademarks."

"After listening to us attentively, asking a great many questions, and debating the subject quite at length, the Chairman of the Committee, the Hon. Benj. Butterworth, who is himself a leading patent lawyer, said that although the House Committee on Patents had no right to constitute itself a Court of Interpretation, yet, as individuals, the members had a right to their opinions and to express them. It was the opinion of the Chairman, and of the members of the Committee, that the views expressed were entirely sound, and that the retail druggists needed no legislation, because if the laws were properly understood and properly applied, the abuses of which we complained could no longer exist."

Now, what are non-secret medicines? I cannot answer this question better than by quoting the introducer of the non-secret idea, with whom I had a conversation recently on the subject:

"As a retail druggist for many years I had been annoyed by the necessity of carrying in stock a host of ready-made secret medicines, commonly called patent medicines or nostrums, advertised to cure all the ills that flesh is heir to, until the burden became intolerable. So I devised a line of scientifically prepared pharmaceutical preparations of my own to take their place. On the labels I placed their exact composition. I did not advertise them, but when patrons of my store asked for remedies for headaches, colds or other slight ailments, I sold them my own non-secret preparations in place of secret nostrums. The plan gave such universal satisfaction that in 1876 I commenced to advocate its general adoption by pharmacists everywhere. Some pharmacists could not afford the expense of printing a lot of labels and locking up capital in lines of medicines of this kind; therefore I made arrangements to supply them with non-secret preparations carefully compounded from the best of materials by competent chemists in my employ, supplying them in handsome packages, labeled with contents, and bearing either my own name as manufacturer, or my patrons' names, as they elected. The business of manufacturing these preparations grew in my hands until others attracted by my success went into the same business. Some of my competitors, however, did not grasp the idea, but commenced to imitate well-known 'patent' medicines. This was not my idea, but opposed to it. It was not my idea to imitate or simulate remedies made by others for similar purposes, whether patented or not. They were not offered to be 'just as good as,' or 'quite the same as,' any such nostrums; but were household remedies, with published formulas, to be sold in place of secret nostrums. If my plan had been generally adopted by the retail druggists, and they had long ago discarded 'patent'

medicines for non-secret medicines made by themselves, or purchased from reputable manufacturing houses, they would be far better off financially than at present.

"In all instances where my plan has been properly explained to physicians, it has met with their hearty approval, as they readily recognized the fact that a demand existed for ready-made preparations of some kind, and it certainly seemed to them more reasonable to have this demand met with medicines whose composition was open, rather than with nostrums of secret formulas. The 'National Formulary' of to-day is but a further elaboration of the non-secret idea."

A druggist who sells a non-secret preparation under his own label, it being at the same time a product manufactured by somebody else, does not jeopardize his reputation any more than he does when he sells fluid extracts, tinctures and other compounds under his own label, but not manufactured by himself. No one disputes the principle that every druggist, if he is able, may manufacture his own preparations, including not only fluid extracts and tinctures, but quinine, chloroform, domestic remedies, and non-secrets as well; but it is not always practical to do so. Whether he makes his own preparations or dispenses the preparations of others is his own affair and concerns no one except himself, provided he is careful in his selection of manufactured articles.

It will be seen that in my sweeping condemnation of the Proprietary System I include preparations extensively prescribed by the medical profession, and also include those proprietary remedies manufactured by each little drug store all over the land as well as the so-called patent medicines advertised to the laity. In so doing I do not condemn the medicines themselves. My condemnation is solely for the system of protection under which they are manufactured and sold, because of the perpetual nature of the monopoly and the secrecy, which taken together are a serious hindrance to the progress of the science of medicine and the useful arts of pharmacy and therapeutics. Every medicine should be published and should be provided with a technically correct name, under which it can be manufactured and sold by all. The Patent Law provides for legitimate protection of inventors, and they are free to take advantage of it. The law is a wise one, and has done much to promote the prosperity of the country. The statute provides: "That any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof, not known or used by others in this country, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, and not in public use or on sale for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the duty required by law, and other due proceedings had, obtain a patent therefor."

In my paper read before the Section on State Medicine of the American Medical Association at its recent meeting in Baltimore, I called attention to a method of remedying the present state of affairs in the following words:

"The main objections to the proprietary system are its secrecy, the unlimited duration of the monopoly, and the unscientific nature of its nomenclature. The great thing in its favor is that it protects the investment of capital better than the patent law. Very few manufacturers with whom I am acquainted would object to a reasonable time limit being set on the monopoly. All manufacturers would agree to the adoption of a scientific nomenclature, as far as I know of. But there are very few who would care to throw their processes open to unrestricted competition, and it seems hardly fair to ask it. Yet, unless some kind of compromise is adopted between what might be called equity and expediency, the objections I have named remain in force.

"Nothing can be done in this struggle with wealthy nostrum proprietors unless the legitimate manufacturing interests will co-operate with the medical profession. Therefore a plan of some basis of co-operation is essential to success. Secrecy of composition is incompatible with scientific prescribing, and should be prohibited; there is no special objection to allowing processes and methods of manipulation to come under the patent or copyright laws.

"Now, I have a compromise to suggest which, it seems to me, would overcome the difficulty. In my recent trip across the continent with a large party of medical men, for the purpose of attending the annual meeting of the American Medical Association held in San Francisco, I suggested the plan to various prominent physicians, who, in the main, agreed in regard to its desirability. It is to *permit* an inventor of a new and useful medical compound to retain the name and secret of manufacture of his invention for a limited time, provided the true working formula thereof be placed in the hands of a national committee of physicians and pharmacists, and the article marketed only under the sanction of the committee. In other words, let the system remain as it now is, only with the exceptions that a censorship shall be exercised over the market by a committee of competent physicians and pharmacists, the monopoly to be limited in time, and the system to be made scientific by providing it with a proper nomenclature, and by the final publication of every invention whereby all pharmacists may manufacture the same when the patents expire.

"I use the term *permit* advisedly. The present position of the trade is in every respect one of assumption, not permission. Pharmacy can never rank as a profession until the proprietary system is abolished, or some compromise of the kind I have suggested is adopted. Either point once gained, then it is time for the medical journals to recognize pharmacy as a profession, and invite the pharmacist to contribute the results of his researches to the medical journals. Pharmacy now only appears in the

advertising pages of the medical journals, which are torn up when the journals are bound. Under such a system there is danger of the pharmacy of the nineteenth century becoming to a great extent a lost art for want of a literature. There are pharmacists who are taking the position I have mentioned now, and they should be admitted as members of county medical societies as honorary members, or active, if they take the medical degree.

"Now, as to the complexion of the committee. I would suggest that it consist of one member each of the American Medical and American Pharmaceutical Associations, and one member each from the medical departments of the Army, Navy and Marine Hospital service, to which might be appropriately added as Chairman the Commissioner or Secretary of Public Health, if such an office is finally created by Congress."

Dr. Henry D. Holton, in his address on State Medicine, delivered at the forty-sixth annual meeting of the American Medical Association, at Baltimore, Maryland, May 7–10, 1895, in referring to my paper from which I have just quoted, said:

"The subjects which would demand attention from a Department of Public Health are exceedingly numerous. The question of proprietary medicine, which interests every family in the land, is an evil which, in spite of the continuous maledictions that have been hurled against it by all scientific medicine, both as organizations and as individuals, has continued to thrive, until at the present time it is intrenched behind millions of money, and is held in high esteem by the people because of its ability to hide its worthless character or possible dangerous combination behind a trade-mark. If the manufacturers of these nostrums were obliged to deposit with the Public Health Department, under certain restrictions, as suggested by Dr. Stewart, the formulas from which they are prepared, it would do more to eradicate this stupendous swindle from the land than all the fulminations that could be hurled at it for centuries; it would have an equally elevating effect upon the science of pharmacy, which is so indispensable to our success."

My conclusion, in relation to the non-secret remedy business, is that it is a step in the right direction. Mystery alone gives many of the proprietary remedies their only virtue. If secrecy can be abolished from the business of manufacturing medicine, a long step in advance will be taken. As I said before, the question who shall manufacture the non-secret remedies is a matter which concerns each individual druggist, and should be left to his discretion. The matter is one of importance, and should be freely discussed. We expect to have it up for discussion at the meeting of the Section on Materia Medica, Pharmacy and Therapeutics of the American Medical Association at Atlanta next year. As Chairman of that section, and as a delegate to the American Pharmaceutical Association from the American Medical Association, I take great pleasure in inviting

you to join in the discussion through the delegation you are to send to the sister association at the next meeting referred to.

Upon motion of Mr. Alpers, the paper was received and referred to the Executive Committee.

Mr. Ryan moved that the readers of subsequent papers be granted fifteen minutes, and if the paper occupies a longer time than that in the reading, that it be abstracted.

Motion seconded and carried.

MR. ALPERS: As a pharmacist, I believe this paper should not be passed without remark. It seems to me that it is in some respects like a package of bitter pills coated with sugar. The author has certainly devoted a great deal of time and endeavor to the paper, and there are, no doubt, many things said in the paper that are in perfect harmony with our views. But the object of the paper, it seems to me, was not so much to condemn proprietary medicines, as to recommend non-secret ones, and the condemnation of proprietary medicines was only put down our mouth as a coating of sugar to hide the taste of the non-secret bitter pill.

I believe it is one of the greatest detriments to our profession that non-secret medicines are sold. I believe it is a slur on the honor of the pharmacist to send out any bottle on which there is a printed label with his name and address, without knowing what that bottle contains. He does exactly that same thing for which he condemns the proprietary medicines. It is stated by the author of this paper that it cannot be wrong to sell medicines the exact formula of which is pasted on the bottle. Yes, but how does the pharmacist who buys these medicines know that they contain the ingredients of the formula printed on them, and what guaranty has he for it? The author compares the selling of such medicines which the pharmacist does not prepare himself with the selling of bi-carbonate of soda, or chloroform, or fluid extracts. If there was ever any sophistry offered to this Association, it was that very sentence. How can the seller of non-secret medicine, the formula of which is printed on the bottle, while the contents remain a secret, compare such articles with legitimate products of a manufacturing chemist, like bi-carbonate of soda or chloroform, where we have the means of testing them and convincing ourselves that we actually do sell bi-carbonate of soda, that we actually do dispense chloroform? How he can compare such products with non-secret products, I do not understand. They are as different from each other as light and darkness. As I said before, while I believe it is a good thing to have this subject mentioned, while I fully agree with the author in all he has said in condemnation of proprietary or patent medicines, while I also believe with him that such medicines have tended a good deal to ruin our business, yet I protest against the preparation of non-secret medicines. It is only tending to demoralize our business more; it does not encourage the ignorant pharmacist to study, and makes the lazy pharmacist lazier. Any pharmacist of ability or pride will prepare his own medicines if he sees the need of it, and the claim that he has not the capital is ridiculous. We all know that when the agents of the secret medicine come to us we have to buy at least three dozen, sometimes six or twelve dozen, in order to get anything like a decent price, in order to be able to buy them at a smaller price than we may think we can manufacture them ourselves. If you who buy these secret medicines would take the same money and buy some labels (you know you can buy a thousand labels for twenty-five and fifty cents) and a few bottles or packages, you will find that the entire expense of getting up the whole business will not amount to more than four or five dollars to start with. If you see it is profitable, you can then extend your business. But to claim that the expense is too high for any one, and that in place of going to this expense

you must buy a lot of proprietary goods amounting to hundreds of dollars, is simply ridiculous. In my experience, every manufacturer of a non-secret has made a point, and a very urgent point, to buy the non-secrets because "they look so much like the proprietary articles." (Applause). That is to say, while we condemn the proprietary articles, we ourselves will aid in perpetrating a fraud by offering something that looks like it. I remember not long ago a representative from a firm in Detroit coming to me and putting a package on my counter and saying, "Don't that look like Warner's Safe Cure? You can make fifty cents on that." He wanted me to perpetrate a fraud, and the higher profit that was made on it was only held out as a bait to catch me. (Applause.) Therefore, if you need any ready-made remedies in your business, if you think it will not lower your position as a professional man to offer and sell them, by all means have energy, respect and confidence enough in your own ability to prepare them yourselves.

MR. SHERMAN: Our friend who has just preceded me complains of the sophistry in the paper which has just been read, and characterizes it as the bitter pill with a sugar coating. Since he has adopted that figure of speech, I hope I may be pardoned if I detect quite as much sophistry in his remarks, and can also see the bitter pill, but minus its sugar coating. He says that when we speak of these non-secret preparations it is wrong to compare them with cream of tartar and like articles, as it is an impossibility to tell whether they contain just what what the label represents. Now, I find there quite a chunk of sophistry, if I am not much mistaken. I do not see why it is not just as possible to ascertain whether or not a bottle contains approximately so many grains of iodide of potassium or citrate of iron as it would be if some scientific or other house put out an article which purported to be tincture of aconite, or some article of the Pharmacopœia which contained several ingredients. Of course it would not be as easy to determine as bi-carbonate of soda or some such article. I am not one of that class of druggists which Mr. Alpers characterizes as those who scrape up a few dollars and buy non-secret preparations. I never had one in my house, although I have been in business many years. But I believe the non-secret idea is the Moses which is to lead us out of the wilderness; and while a great many have been able to make the necessary outlay for buying labels and packages, and making their own, there are others who have been glad to avail themselves of the non-secret preparations, and I do not see why it is not the next best thing to making them yourself.

MR. RYAN: I just want to say a word in reply to the gentleman who has just spoken, that I do not pretend to be much of an analyst myself, but when he finds out how to analyze a package of the so-called "Sarsaparilla" that is put on the market, and can tell me what it contains, I wish he would write and let me know.

MR. KLINE: While on this subject of non-secrets, I would like to say that I have sold a great many here in Denver, and have never yet handled any that I thought were an imitation of a patent medicine. In fact, the style of the packages seems to have changed very much in the past few years; there are none that I know of now which are put up to imitate any proprietary article; and I wish to concur with the gentleman who has just preceded me that the sale of non-secrets in this part of the country has to a great extent supplanted the regular line of proprietaries. Regarding the formulas on most of the goods, while possibly none of us are competent to analyze them, I think they are certainly as reliable as any of the proprietary remedies. They give a much greater profit, and the business is just as legitimate as selling any of the advertised nostrums.

DR. STEWART: I am very much obliged indeed for the discussion on this paper. Of course I brought the matter up for discussion. Every one is entitled to an opinion, and

these discussions bring out the differences. No line of work is entirely free from objection probably, but I have studied this matter of non-secrets carefully and it seems to me that it is a step in the right direction, and so I have stood up in its defense. So much has been said in regard to the matter that it is hardly worth while for me to discuss it further. I wish to state one thing, however, and that is that simulation and imitation of patent medicines I very thoroughly oppose, and in no way intended in my paper to stand up for fraud, imitation or anything of that kind.

THE CHAIR: What disposition will you make of the paper after the discussion?

Upon motion, the paper was received and referred to the Executive Committee.

The following paper was then read by Joseph Helfman in response to the same questions propounded, to wit: Queries 8 and 9, and upon motion of Mr. Alpers the paper was referred to the Executive Committee.

NON-SECRET MEDICINES.

BY JOSEPH HELFMAN, DETROIT, MICH.

The right of the druggist to offer for sale and to recommend certain household remedies, for which no one dreams of applying to the family physician, is never challenged save by the fanatics who howl against counter-prescribing when a sick man is given a glass of water. The memory of man goeth not back to the time when it was not the druggist's privilege to offer his own liniment, salve, corn-cure, dandruff-cure, tooth-powder, mouth-wash, sarsaparilla, hair tonic, Jamaica ginger or laxative pill. The self-preparation and the sale of such articles are to-day rightly accounted as marks of commendable enterprise.

The inevitable corollary scarcely requires expression, so well is it understood. Whatsoever the druggist may make and sell, that he may with propriety have made for him by those who can do the work more speedily, neatly or economically; and the service which the pharmaceutical manufacturer may here render him is unquestionably legitimate.

If the non-secret industry were thus limited to this field of manufacture, it would be open to no honest censure, and this paper would remain unwritten. But here qualification, aye condemnation, begins, and a proper heed of the variety and character of non-secret medicines, of the methods by which their sale is promoted, of their injury to pharmacist, physician and public, is demanded ere the subject may be dismissed.

Conceding freely the manufacturer's right to prepare for the druggist those legitimate household remedies which the latter cannot make for himself, I expressly and emphatically deny that either druggist or manufacturer has a right to urge and laud to the public the virtues of those countless nostrums which fill the pages of the non-secret catalogue—the dyspepsia cures, the consumption remedies, the panaceas for kidney complaints, the emmenagogue formulas, the aphrodisiacs, the unsavory dopes

for venereal disease! Who that has ever beheld such a catalogue will leave unresented the insult to his intelligence which is offered in any definition of non-secrets as "household remedies?" Non-secrets are notoriously co-extensive with patent medicines. For every popular patent there is a non-secret imitation (or a score of imitations) intended to replace the patented model. And the scorn with which upright men regard the great mass of patent medicines, and the industry as a whole, barring exceptions which only prove the rule—its falsehoods, its exaggerations, its appeals to ignorance and fear and shallow hope, its utter disregard of human misery, and unscrupulous striving to make capital of human suffering—a part of that scorn, I contend, should be visited on the more insidious, but equally extensive and baneful non-secret.

What the patent medicine is we know full well, but the wretched traffic should at least receive credit for what it is not. Let us give a certain individual his due. The originator or proprietor of a patent medicine—howsoever great the humbug—does not imitate wrappers, labels, containers, cartons and names of preparations. The evil *he* does is at least done openly; it is not aggravated by piracy and appropriation of other men's advertising, restrained only by the penalties of the law.

Dismissing now the *methods* of the non-secret maker, let us consider the influence of the non-secret traffic on the druggist who fancies that his own label on the bottle will be an advertisement, and that greater profit will likewise accrue from the sale of a cheaper imitation. Is it not palpable that when the druggist prevails on the customer to buy, for example, *his* kidney cure instead of Warner's, or *his* sure specific instead of Swift's, *he* becomes sponsor for the article furnished, assumes responsibility for its virtue, and must needs suffer the odium of failure? Suppose the patient has made a stupid diagnosis—suppose he has mistaken his ailment. The remedy fails. Who is held accountable? The druggist, who palavered him into the purchase of an unwelcome imitation. Had the article requested been furnished, failure would have brought no blame to the druggist; it would all have fallen on the product and its maker.

As a business man, the druggist must also realize the irritation, sometimes expressed but more frequently dissembled, which follows the successful effort of a salesman to induce the customer to buy something he doesn't want. The customer yields to persuasion, takes the non-secret, but mentally resolves that next time he will go where his order will be filled without parley.

Meanwhile, what is the attitude of the physician? Let us remember that the medical profession regard with an uneasy dislike the mere sale of patent medicines by the drug trade, even where such articles are not offensively paraded but only furnished on demand. The more liberal-minded and tolerant doctors realize that custom and tradition have taught the public to apply to the druggist for patent medicines and that the druggist

is forced to supply the demand. Under these circumstances they say nothing, though they often "do a heap of thinking." But when they behold the druggist transformed from a passive into an aggressive vender of nostrums under the temptation of the non-secret—when they perceive that the extra profit has made of the druggist a nostrum missionary, and that, not content with supplying an existing demand, he is striving to augment that demand—then, depend upon it, the conviction speedily ripens that *their* interests and his are incompatible.

But the gravest objection to the non-secret traffic I have yet to advance —an objection based upon the common report of many reputable druggists. The honest druggist—and to the dishonest this paper is not addressed—has no right to sell preparations which, *in many instances*, are notoriously false to the alleged composition appearing on the label. This is a serious accusation. But what is the frequent experience of intelligent pharmacists? I need only cite the latest denunciation by the President of the Kentucky Pharmaceutical Association at its last meeting.

He states:

"If ever a misnomer was applied to any class of preparations, it is to the so-called non-secret remedies. One would naturally suppose from the name that everything connected with them, even to the minutest detail, was open and could be told to the world. But, stop a moment, prepare a product following exactly one of these formulas as printed on their labels. The result would be so unexpected that if you had not known the ingredients and added them yourself, you would not recognize the product, either in appearance, in taste, or in effects . . . What the manufacturer says they contain and what they do contain, are quite different."

But so great is the general aversion of the better element in the pharmaceutical fraternity, to the non-secret remedies, that (on this floor) I feel very much like a man who is carrying coals to Newcastle, or wasting battle on a cause already lost beyond salvation. Among the great mass of intelligent and honest druggists the non-secret traffic is in hopeless disgrace; it is regarded with enmity because it is an injury to their business, because its larger profits are illusive and cost dear in the end. Nor is this hatred of non-secrets exclusively selfish; mingled with it is the contempt inspired by culpable methods of business, practiced at the cost of a common injury to pharmacy, to medicine and to public health.

MR. HALLBERG: I think this is a case of the kettle calling the pot black. (Applause.) I would like to know if the time of this convention is to be taken up by rival institutions coming here for the purpose of airing their views on a question of this character. (Applause.) There are two sides to this question, and if these gentlemen had lain awake nights for weeks they could not possibly have reached further extremities in each case than they have succeeded in presenting to us here to-night; and I for one am certainly opposed to loading the reports of our proceedings and the records of the Association with these purely ex parte statements as to the relative qualities of secrets and non-secrets. I would not give the snap of my finger for the difference of the statements

of these two positions that have been presented to us. I do not favor non-secrets, but I certainly object to the slurs that have been thrown here promiscuously, and without any qualification whatever, upon every druggist that desires, or by a combination of circumstances is almost compelled, to make use of a few non-secret remedies. (Applause.) There is no question in my mind but that there is a fairly legitimate field for them. It certainly is in bad taste for a concern to come here and in such unmeasured terms decry the use of non-secret medicines, when at the same time it is one of the largest producers of the rankest kind of patent monstrosities, from pink pills to female regulators, etc. (Applause.) I say, Mr. Chairman, let these gentlemen come here with clean hands if they want to present this question, but I am opposed to having any such extreme views presented here, either for the secret or for those that are non-secret. (Applause.)

DR. STEWART: I would like to say one word in explanation of the paper, both for the speaker who spoke after me and for myself. We would not have brought the subject up, probably, either of us, except for the queries that were put in here, not by ourselves, but I presume by the Chairman of the Section or some one else.

THE CHAIR: The Chairman stands up for his own crimes, and does not ask for a substitute. I take the responsibility for the queries, and therefore you had a perfect right to answer them. The Chair simply defends himself by having stated in the beginning that he was going to give all the papers fair play, whether we publish them or not, and I believe that if error exists in any paper we can evaporate it very quickly in this Section.

MR. HELFMAN: May I have a word to say in response to the stricture of Mr. Hallberg on my paper? Professor Hallberg has very vigorously denounced what he calls the extreme and *ex parte* tone of these remarks. He undoubtedly was not aware that the different parties were invited to address this Section on these subjects. They were written in response to these queries, and I give you my word of honor that these papers never would have been conceived or written if I had not seen those articles. I beg leave to assure the esteemed professor that not one thing that I have said was one-tenth so severe as the remarks made in the Chairman's address this afternoon.

The following paper was then read, and upon motion of Dr. Stewart received and referred to the Executive Committee:

A FINAL REMEDY.

BY CLAY W. HOLMES.

The last quarter of a century has witnessed many and startling changes in pharmacy. While rapid strides have been made scientifically, there seems to have been quite as constant a decline in its commercial condition. To such an extent has it pervaded our profession that to-day the scientific character of our gatherings is entirely lost in the maze of problems for trade relief. Many and various have been the theories advanced, and earnest the effort to devise some plan whereby the relief sought might be obtained.

It is not the aim of this article to give a history of the struggle. It will be conceded by any careful thinker that none of the plans proposed have accomplished even a small part of the result sought. The general tenor of all the plans suggests the admission that no effort can be successful without perfect harmony and a united stand by every pharmacist in the coun-

try. The difficuly seems to be how to get perfect unity. Really this is the keystone of the arch, and unless such unity of thought and action be obtained no plan can even hope to succeed.

Heretofore the ideas advanced have all been trade ideas, without the remotest thought of involving the professional idea. The writer has carefully studied each and all of the ideas advanced, but sees in none of them any practical possibility of success. The most recent effort is called the Detroit plan. It is individual in its character, and wears a questionable look on its face. It proposes to enlist each druggist in the country as a subscriber to a five dollar share of stock, but incidentally a trade sheet becomes the talking feature of the plan. Without any idea of attacking the plan or arguing pro or con, it seems to be weak at the fountain head, and will doubtless meet the fate of its predecessors.

The fact is conceded, that a successful plan involves the greatest pharmaceutical problem of the age. Without wasting time or words on any glowing picture of what might have been or may yet be, it is our desire to contribute a thought on a new line, in the hope that older and wiser heads may catch a working idea and develop it. A majority of the states have pharmaceutical organizations and boards of pharmacy. Any concerted move by these bodies will involve the great body of pharmacists in the country, and inaugurate a condition of things which would bring about the desired change, if anything can. To establish a working body which can perform the work expected of it requires a large capital. The absence of money has been the root of failure in all the plans thus far tried. How to secure sufficient funds without imposing a burden on the already overtaxed druggist, is the great point in question; also how to maintain a sufficient income to continue a good work well begun. To our mind, there is but one way under the sun to arrive at a working combination, and that is embodied in a uniform annual re-registration of all licensed pharmacists, under some plan similar to that suggested at the last meeting of the New York State Association. If all state associations will equalize their pharmacy acts, and throw the funds produced by re-registration into their association treasuries, permitting every licensee to become a member of the association and entitled to its benefits, each druggist then becomes not only a contributor to a general fund, but also entitled to a full expression of opinion and a vote. In this way, if any, his interest will be aroused. The state association and the board of pharmacy, working in conjunction, become the united power which can move the wheels of commerce, so far as pharmacy is concerned. The interests of the manufacturer, jobber and retailer are so closely allied that such united power by the retail trade will at once secure the entire and perfect co-operation of both manufacturers and jobbers, *nolens volens*. This idea, if carried out, would culminate in an equalization of all pharmacy laws, exchange of certificates, unification of local boards of pharmacy, and solve many indirect

questions which have no material bearing on the direct point at issue. It may at first seem an impossibility to arrive at any such uniform condition, but if each state would take hold of the work with vim, the final result would be arrived at quite as soon as by any other plan. Such an idea involves the co-operation of the Section on Pharmaceutical Legislation, but, as a division of the question is hardly practical, it would seem entirely fitting for this Section to consider the matter first, and on this ground I respectfully submit the ideas involved herein as worthy of more than passing notice.

MR. WATSON: Inasmuch as there is an excursion at half past eight in the morning, and it is now eleven o'clock, I move we adjourn.

Seconded.

THE CHAIR: Before that takes place, I would like to say that we have reports of these special conferences on the subjects suggested by the Chair, and a discussion on the question of alcohol that will come up. We also propose to give the floor to Mr. Hayes on the matter of the Universal Trade Association; then there will be the election of officers, all of which I am sure will take another session; and I now notify the Permanent Secretary that we want another session and propose to get it. We stand adjourned until you are notified when our next session takes place.

THIRD SESSION—MONDAY MORNING, AUGUST 19, 1895.

Chairman Seabury called the Section to order at 10:30. The reading of the minutes of the preceding session being dispensed with, the following paper was read:

AMERICAN INDUSTRIES.

BY N. A. KUHN.

A great reason for the present depression in business, and the gold scare that some have, and many affect, is the great amount of money that Americans spend in Europe, and much of it unnecessarily. This year at least $75,000.00 in gold will be taken to Europe by tourists, the majority of whom have not seen the majestic gorges of Colorado, nor the beauties of the Yellowstone Park, nor the wonders of the Yosemite. Europe has nothing to equal the sights of "Beyond the Mississippi."

Here in this one item goes one-seventh of all the gold in circulation in the United States.

The best mines are stocked and bonded, and the securities sold in Europe, where the dividends on stock and interest on bonds are remitted in gold. The craze for foreign titles takes much more of the yellow metal across the sea, along with the wealthy heiresses who marry the paupered titles of Europe. The phase of the subject that this Association has a direct hand in, is the trade-marked and coyprighted medicinal preparations introduced to the medical profession of this country by the shrewd

foreigners who see in our trade-mark and copy-right laws the only chance in the whole world for foreigners to levy tribute on the inhabitants of another nation, and have the filched nation protect the foreigners, to the financial detriment of her own citizens. Is this just to ourselves? All disinterested parties say it is not right that laws should be so framed that a foreigner and his American agent should alone reap all the benefits of our copyright and trade-mark laws, which are now framed to do so.

The United States is a country where new chemicals are pushed, because our laws protect the foreign manufacturers to the exclusion of American makers. These new preparations are introduced into America because our physicians are always on the alert, looking for new remedies for and improved treatment of diseases. Hence all new remedies are at once introduced here as the most fertile field in the whole world, and the highest priced market in the universe, as our government gives them a monopoly if they only register their preparation. Why should this be so? No reason, but many why it should not be so. The laws should be so framed that they would encourage home manufacturers in place of hindering them. Why should a man be allowed to register a yellow powder as "Dermatol," and give his agent an opportunity to threaten any one, who makes Subgallate of Bismuth, with a law-suit and an accounting? Why should we pay $1.40 an ounce for "Antipyrine," when it probably costs no more than Acetanilid to make? Why should our government give the exclusive franchise to a foreigner to furnish our sick with his preparation at his own fancy price, in place of encouraging our own home manufacturers to produce it? Why should we have to pay $3.50 per ounce for Chloralamid, when ten pounds can probably be made for the cost of an ounce?

We might go on indefinitely with the antipyritic, hypnotic, and other classes of remedies that are pushed in the United States alone. Is it any wonder that the wealthiest nation in natural resources should be hard up for ready cash, and the net gold reserve in the United States Treasury continually scrutinized! It is not strange, in view of the foregoing facts; and it is our duty as the most influential of all the merchants to form public opinion to see the injustice of these acts of Congress and persuade our Congressmen to change the laws at once.

Germany is discriminating against everything American that she can. Why should we not legislate to at least give our own countrymen an equal chance with the Germans? Why should we import foreign wine when we can produce better in the United States? The American Consul at Marseilles says, immense quantities of alcohol are imported from America into that port to be worked up into liquors to be re-exported to the United States, and make this country pay the Frenchmen a profit on our own goods. Peanut and cotton-seed oils are also sent to the same place to be mixed, and labelled as "olive oil," and returned to the United States.

Why should plasters and surgical dressings be imported, when the Amer-

icans make the best in the world? Why should we not push American hair brushes, when better are made in this country than in any foreign land? Let us help along the sentiment for American perfumes, many of which are sweeter and more lasting than any European extracts.

It is an acknowlecged fact that American pure glycerines are better than those of any foreign make.

"American Industry" should be the watchword of every patriotic citizen. If we pursued the policy of handling and using only home-made goods we would have no trouble about a gold and silver basis; we could regulate their respective values to suit ourselves, snap our fingers at the rest of the world, and grow fat, saucy and wealthy, perfectly independent of foreign complications.

It was moved by Mr. Lemon that the paper be received and published in the Proceedings.

Seconded and carried.

The next in order being the report of the Committee on Resolutions, Chairman Wooten read the following report:

Your Committee on Resolutions would respectfully report that they were organized by the selection of Thomas V. Wooten as Chairman and Clay W. Holmes as Secretary.

They considered the topics presented by the Chairman's address as thoroughly as the limited time at their disposal would permit, and beg leave to submit the following general preamble and resolutions:

WHEREAS, The American Pharmaceutical Association has the best interests of the retail pharmacist at heart; and

Whereas, It is self evident that thorough organization will elevate the condition of pharmacy as a professsion; and

Whereas, The American Pharmaceutical Association pledges its support to any well directed efforts made by such organizations for the accomplishment of the desired results: Be it

Resolved, That we urge it as of vital importance that permanent local association should at once be effected everywhere to correct such abuses as exist.

Resolved, That such local organizations should at once give their attention to the correction of the following abuses:

1. Department-store drug traffic.
2. Indirect and irregular business transacted by the jobbing trade.
3. Influencing the medical profession to return to their first allegiance.
4. Turning of the traffic of manufacturing pharmacists to its legitimate channel, as indicated in the resolutions adopted at the forty-second annual meeting and printed on page 78 of the Proceedings of that year.

Resolved, That the Secretary of this Section be instructed to send a copy of the resolutions adopted to the President and Secretary of all state organizations, and to such local associations as may be known to exist.

For the Committee:

(Signed) THOMAS V. WOOTEN, *Chairman.*

CLAY W. HOLMES, *Secretary.*

Upon motion of Mr. Corcoran the report of the Committee was received and adopted.

THE CHAIR: The next question is the elevating one of free alcohol. I do not think it is necessary for the Chairman to make any remarks on this subject, because I am of the opinion that nearly everybody is agreed; but if you deem it pertinent or proper at this time to put yourselves on record, it might be well for us to pass some resolution giving the consensus of our judgment on that question at the present time. You all know that it is in a state of great uncertainty, Congress having made no appropriation whatever. They have made no regulations for this rebate, and, as I stated in my address, it seems to me to be a wise thing not to attempt to debate this question now; but I do think we should put ourselves on record, even if we may not be united on what should be done. If there is any discussion desired on this subject, it might be taken up pending the arrival of Mr. Thompson to make his report.

A motion was made that while the Section was awaiting the arrival of Mr. Thompson, the privilege of the floor be granted to Mr. N. Hayes, Manager of the Universal Trades Association, to explain the methods of that institution.

MR. EBERT: While I believe that is a very proper thing to do, if we take that action without any comment I fear that the next issue of the trade circular published by that association will contain in large type the following: "The Commercial Section of the American Pharmaceutical Association tendered to our manager the privileges of the floor, but on account of some unforeseen accident he was unable to be present; therefore, the druggists of this country can see in what estimation our plan is held." There are some gentlemen present who have a pretty good idea of the workings of this institution, and we ought to ask them to give us an explanation of the same.

MR. COOK: In reply to what Mr. Ebert has said, I move that the record be completed by stating that the gentleman was not present and did not appear, and therefore the Section passed on to the next business.

MR. MAYO: I believe he has been given notice that he would be expected to be here to-day, and that would place the onus of his absence upon himself.

THE CHAIR: The Chairman has thrice notified him, so he cannot plead ignorance of the fact that he was invited.

MR. MAYO: Something of that nature ought to appear in the Proceedings, so that, as Mr. Ebert says, the journal that represents his concern cannot place the matter in an improper light before the druggists of the country.

MR. KLINE: I might say that Mr. Hayes called on me about seven or eight o'clock this morning, and stated that he was going on that Leadville trip to-day. I told him that he was invited to appear here, and he said that he thought it best not to do so, and that he would let it go by this time and return here this afternoon or evening.

THE CHAIR: Let us take up this question of the Universal Trades Association, and get a consensus of opinion as far as we can. Are there any remarks on the methods employed by that association as far as they have gone and what we know from actual experience? I think there are some gentlemen present who have had some experience with Mr. Hayes, and could probably place that association before us in its proper light. I myself have tried to get at the intent of the association, but I can learn very little of what is being done. They are getting names and they are getting five-dollar notes, but I have yet to hear any one say that he received anything for his five. What is done with these moneys tending to protect the retailer who has paid his five dollars? No one

seems to understand. The benefit is all to be derived in the "sweet bye and bye" sometime, but I think it is the duty of the Section to take this matter up. It is one that is impelled by what you might call a personal enterprise, that would make it of such a nature as to require a very close investigation before we allow our people to pay out their five-dollar bills. I would not throw cold water on any plan that I thought we could derive some benefit from, but I am sure I don't see anything in this plan. I have studied all these plans since 1881, and they are all the same. The only plan that will ever succeed must come from the head, and not from the pocket-book. There are localities where they inflict material penalties for violating agreements; these are few and in the large centers, but in the smaller cities they make merely a verbal agreement between themselves.

MR. HOLMES: A representative of the Universal Trade Association came to Elmira and called on all the druggists and invited them to have a meeting, and the president of the local city association considered it advisable to call a meeting. He did call such a meeting, and I was invited to be present. The gentleman succeeded in gathering together some six or eight out of a possible twenty-five, and when they had come together the meeting was called to order and the gentleman was asked to explain his plan. He talked about an hour and a half, and the gist of it was this: That a few gentlemen in Detroit had resolved themselves into officers of an organization; that they had formed a stock company and gone down to West Virginia to have it incorporated; that they had deposited there ten thousand dollars, in accordance with the laws of West Virginia—that is what he said—and that they had started out to get all the druggists interested in this way: A man was to subscribe for one share of stock at five dollars, or he could subscribe for twenty shares if he wanted to, and at the same time he was expected to subscribe a dollar for their mouth-piece, The Retail Druggist. Then he stated that in every city he canvassed he got all the names, and he had a list from Buffalo that really had on it the names of a large number of druggists, some of them prominent ones. He took special pains to show these prominent ones. He also showed a resolution of the local organization of Buffalo endorsing this plan, and asked the Elmira local society to endorse it. Well, some one made a motion to accommodate the gentleman; one man voted for it audibly, and the president declared it carried, and he got the endorsement. I assume that this is a fair sample of the endorsement he got from the other societies. Eight men voted for twenty-five druggists, the best of whom were not present; and he carries that endorsement to the next town and presents it as the voice of Elmira. There wouldn't anybody subscribe for stock that night, but he went around the next day and got several subscribers, who paid $5 apiece. To those gentlemen who would not subscribe anything he would say, "If you don't care to subscribe just sign your name to these resolutions; that is all I want." He got a number of additional names, I am told. When this gentleman got through talking I asked him a few questions, and I said, "You haven't got the endorsement of the American Pharmaceutical Association, nor have you the endorsement of any of the State Associations." "O yes, I have." "Well," I said, "produce them;" but he did not. I said, "You haven't got the endorsement even of the wholesale trade." He did have a printed slip of a very weak endorsement signed by two druggists. I think they were of Chicago or Detroit, two members of the wholesale trade, who are perfectly reputable; but two men cannot speak for the United States.

Therefore, I assumed that the Universal Trade Association was a personal business enterprise, and that these men were paid to go around the country and get all the five dollar bills they could. And when they get through they say they are going to do something; they are going to get all the druggists in the United States, and then they are going to protect them. He couldn't explain how; he did not know anything about that part of it, that was left for the officers. The gentleman said, "As soon as we get this

organized, we are going to the manufacturers and we are going to have them take the coupons, the double coupons, for which they will pay eight cents a dozen for dollar goods; put one on the label and a duplicate of the label on the bottle; part of this is printed in indelible ink, and when they paste the label on that will transfer it to the label of the bottle, so that you cannot get rid of the number without destroying the entire label. That is the way in which we are going to get the money to pay you dividends, and at the same time carry on the work. You know there are a great many dollar goods sold, and we will probably get in four or five hundred thousand dollars, and there will be lots of money paid back in dividends." He was a paid representative and was supposed to know the actual facts in the case, and to put the best side out. My own opinion when he got through was that it was the weakest presentation of any plan I ever heard, and one that seemed to have so little of merit that it would not be considered in this Association a moment, and I certainly think that this Section or the American Pharmaceutical Association would be going far beyond their duties if they were to endorse in any particular this matter of the Universal Trade Association. I think the gentlemen who are connected with it are reputable men: at least, I know two of them personally, and they are very reputable men. I do not wish to say anything against the officers; but we see so many concerns organized, with nothing behind them, with a view of profit, that it will bear investigation. If they had the resolution of any organized body of pharmacists back of them, authorizing the incorporation of this body, I would think differently; but they have no endorsement whatever. They said, "You take this paper and that will run out all the other drug journals in the country; that everybody would take this journal and nobody would care to take anything else, and that then the enormous subscription of this journal would bring in a large advertising patronage, and the subscriptions would be all clear profit." I said, "We have a number of good drug journals in this country, and I think the people will read them."

You can see for yourself what is in it. It is all personal so far as I can see, and I should hesitate very much before I gave up five dollars for a share of stock in such an organization as that.

Mr. Carter: In Indianapolis we had a meeting of the local Association and we refused to endorse the plan of the Universal Trade Association, because we did not care to put money into it, and the sentiment of the druggists was that they would not endorse a plan that they would not invest money in. On that ground the gentleman got no encouragement out of Indianapolis.

Mr. Cook: I move you that after the explanation which we have had of this subject, and from the statements we have heard, that as the matter seems to have no particular interest to this Association, further discussion of it be discontinued.

Dr. Stewart: I hope that motion will not prevail. I think this is an important question, and I hope we will go on and follow up this matter. The druggists of my town expect me to come back there prepared to inform them in reference to this matter, and I want information.

Mr. Klotz: I will not take up one minute more of your time than is absolutely necessary, but I will try and ventilate this question to my fullest knowledge, and try to make it as clear to you as I possibly can.

As I understand it, this plan was at first conceived in the mind of Mr. Hayes, in the early part of 1893. About November of that year the first article appeared on it in the "Pharmaceutical Era," giving a short synopsis, which Mr. Holmes has explained before. In regard to the plan, in my mind, gentlemen, if it were a possibility to induce the manfacturers and wholesalers to work with us and introduce that plan, and it was lived up to

by all concerned, it would put an end to the cutting question of this country for once and all. So much for the plan. I have studied it carefully. It has many good points in it, and the only thing it needs is to be put in operation to put an everlasting stop to and eradicate the evil of cutting, root and all. The plan undoubtedly is an admirable one. Now so far as carrying out the plan is concerned, I will give you the experience we have had in Chicago. In November, 1893, Mr. Hayes, the representative of the Universal Trade Association, called at my store in Chicago. I happened to have a "Pharmaceutical Era" lying on my desk; he opened it and showed me the article in reference to it, and asked me what I thought of it. Oh, I told him I had spent so much time and looked over so many plans and found them all not possible to carry out, that I did not pay any attention to it. He went on to explain the different details of the plan, and I became interested in it. He opened up a book or pamphlet giving an endorsement of the plan signed by all of the retail druggists of Detroit, some two hundred and forty. I began to get interested and called the attention of some of my neighbors to the plan, and we decided to invite Mr. Hayes to a mass meeting of druggists in Chicago to explain the plan, which he did some months later. We saw the plan endorsed by the entire retail trade of Detroit, and took it for granted that the gentleman was working with heart and soul for the adoption and carrying out of the plan, and we heartily endorsed it. Mr. Haves appointed me Financial Secretary for Chicago, and we at once went to work to get subscribers, all the way from twenty shares down to one, and also made collections. After about a week's work questions came up or were brought before us, and we came to the conclusion before we went any further we would look into this matter and see what merit there was to the plan, and what foundation there was to the Association as an association and as a stock company. Mr. Van Herman, the Secretary of the Chicago Retail Druggists' Association, and myself, constituted ourselves as a committee of two to take a trip to Detroit to investigate the workings and the standing of the Association so far as it had gone.

When we reached Detroit we went into the most prominent stores—using our own judgment, and we found later that we were not mistaken, that we got right to headquarters—and made inquiries in regard to the plan, as well as in regard to Mr. Hayes. I tell you, gentlemen, we did not find one person in the city of Detroit who ever heard of Mr. Hayes, or who had ever endorsed the plan. We had this pamphlet that Mr. Hayes had left with us as ammunition, and we opened it up, and we said to the first man, "You say you never heard of the plan?" "No, sir." "Well, we see that you endorsed it." He looked at it and said, "That is our firm's autograph, but I do not know how it got there." We went to eight or ten different retail druggists; we went to the wholesale house of Williams, Davis, Brooks & Co.; we went to the house of Parke, Davis & Co., and various other places, and we failed to find one man that knew anything about the plan, or anything about Hayes. We finally learned that Mr. Hayes was installed in a very small store as a retail druggist in the western part of the town. We did not find it worth while to go out and take a look at his store. Then we decided to go to headquarters and find out how matters stood with the Association. We had a Mr. Charles E. Marble noted as Secretary of the Association. When we got to the office of the Universal Trade Association, 422 Hammond Building, we found no one there but a lady who was in charge of another part of the office, and had nothing to do with it. She said about 11 o'clock a Mr. Fletcher would be there, who received letters and forwarded communications to Mr. Hayes when he was about the country. We returned about 11 o'clock and met Mr. Fletcher, and asked him to produce the Secretary of the Universal Trade Association. He at first was afraid to open his mouth or say a word, until we got him by the coat collar, figuratively speaking, and he opened up and said he would produce Mr. Marble inside of fifteen minutes. He telephoned to him, and a young man by the name of Marble came in. We asked him if he was Secretary of the Association.

"Yes, sir." We asked him what condition the Association was in. Well, he didn't know. As Secretary, he ought to be in possession of some of the books. He didn't have any books. We couldn't get any information from this young man, so we looked up the Treasurer of the Association. This man, Charles E. Marble, is not a druggist; he is a clerk in a wall paper, paint and oil store. Getting no information from him, we decided to look up the Treasurer. We found him after a very short search, and we found in him a very pleasant, amiable gentleman, a man by the name of O'Conner, or Conner. We asked him to give us an idea of the standing of the Company. Mr. Hayes, in the meeting at Chicago, had told us, upon being questioned, that there was some $3,500 deposited in the bank to the credit of the Association, and there were outstanding funds in subscriptions, etc., to I don't know what sum. But upon questioning the Treasurer in regard to these facts, he said, "I have been Treasurer of this Association since it was organized, but so far have not received any funds, and have not seen any. I don't know where the company deposits, and the only money I have ever received or had in charge is a check for $350 sent to me from Chicago, which still lies in my vault." After talking with Mr. Conner for some time, he got to be so worked up over the way he thought Mr. Hayes was trying to introduce the plan, that he said he would sit down at once and send in his resignation as Treasurer of the Association. When Mr. Hayes was in Chicago he told us no one but retail druggists should be allowed to become members or to subscribe for stock. When we got to Detroit we found not a single druggist connected with it. The Directors of the company were tobacco merchants and coal merchants, and the officers were a wall-paper-store clerk and a mining speculator, or politician, or whatever you may call him. We were very much disappoinred in finding the conditions that way. We returned to Chicago with a rather unsatisfactory report. At the same time, having in view and being satisfied that the plan was a good one, provided it was carried out, we summoned Mr. Hayes back to Chicago to have a conference with us.

We came to the conclusion that if we wanted to put this plan into operation we must take it out of the hands of tobacco merchants, wall-paper clerks, coal dealers and so on. We got Hayes to the conference in Chicago, in which he agreed to surrender to the Chicago druggists or the St. Louis druggists or Detroit druggists, or whichever might be referred to—to surrender unconditionally the entire stock company association, all stocks and shares, and everything connected with it, upon his return to Detroit. He had formulated some stipulations to which we should agree, and in carefully reading them we came to the conclusion that he had again tried to arrange in those stipulations to make himself what he had been right along in our minds, President, Manager, Secretary, Treasurer and office-boy of the Association. We declined to accept those stipulations, and in its place the subject was brought up in a mass meeting of the Chicago Retail Druggists' Association, and a committee there was appointed to investigate the plan more thoroughly. This committee, in session, decided to delegate a committee of one to call upon the principal manufacturers and see whether the assertions that Mr. Hayes had made to us in Chicago were true, that he had a large majority of the proprietors, manufacturers of patents and so on, all endorsing his plan as he had claimed. Mr. Van Herman, Secretary of the Chicago Retail Druggists' Association, was persuaded after quite a struggle—he did not want to go or sacrifice his time—but he was persuaded to go east and call on the various manufacturers. He started the following day. He reached Lowell, Mass., and called on Mr. Hood; he had quite a time in getting an audience with Mr. Hood or his representative there, as Mr. Hood himself was sick, and the sum total of the conference was that they had neither endorsed the plan nor had they given Mr. Hayes any encouragement that they would ever adopt it. The very same result at Ayer's. Mr. Van Herman, thinking that two of the principal manufacturers point blank refusing to consider the plan was satisfactory evidence that the plan never would be carried into

effect, telegraphed us. We were all ready at that time to board a train and join the annual meeting and election of officers in Detroit of the Universal Trade Association. Upon receiving that telegram from Mr. Van Herman, of course we dropped that matter at once and paid no further attention to it. It simply amounts to this, that so long as the manufacturer will not stand by us or work with us, the plan that the Universal Trade Association intends to put into operation will not amount to a row of pins.

THE CHAIR: And it will not if they do.

MR. KLOTZ: If they had at first consulted the manufacturers and got their consent to adopt the plan, then it would have been an easy plan to carry into effect and and I think it would have worked admirably.

MR. CORCORAN (of Kansas City): I think from what Mr. Klotz and others have said we have a very clear knowledge of this movement, and that we need not lose any more time perhaps in having it explained. For myself I am satisfied that it would not do to endorse it. If it is proper I would like this Section to pass a resolution saying that we think that this is not a good thing and the druggists had better keep clear of it, for this reason: The agents of this concern are going over the country, and they go to the druggists and present the plan to them in their plausible way and from their stand-point, and most of them think it is a very good thing, and they are liable to fall into the trap. I believe it is the duty of this Association to do what it can to protect the druggists against all such things as this, and I believe we have here an opportunity to do a great good to the druggists of this country by taking such action in this matter.

THE CHAIR: Suppose that you recommend that this matter be brought before a committee of three and let them draw up a resolution during this session, and if we are not ready for it, to have it presented to the General Session of the Association.

MR. CORCORAN: I move you that the Chairman of this Section appoint a committee of three to draw up a resolution to be presented at this session if possible.

MR. SEMPILL: My impression is that the entire talk has been against Mr. Hayes, and not against Mr. Hayes' plan at all. I have talked with hundreds of druggists, and everybody seems to think it is the best plan, if it could be introduced. I am not endorsing Mr. Hayes, however.

THE CHAIR: I think the plan was discussed and not Mr. Hayes, only his methods. I think so far as that is concerned we have heard of nothing but the plan.

The question then being put upon the appointment of the committee as moved by Mr. Corcoran, the motion was carried and the chair appointed Messrs. Klotz, Corcoran and Ebert.

MR. KLOTZ: Before we drop this matter entirely, perhaps it would be interesting for the druggists of the United States to learn how and where the Universal Trade Association was incorporated. I saw the original charter granted by the State of West Virginia in the office of the Universal Trade Association in the Hammond Building, Detroit. We found that the company was incorporated for one million dollars, divided into 200,000 shares of five dollars each. The secretary, Mr. Marble, had subscribed I think for three shares. Mr. Conner as treasurer had not subscribed, but we later learned that he was donated fifty shares; the tobacco merchant, whose name I do not remember, had 100 shares I believe, and Mr. Hayes had subscribed for 50,000 shares, which at the par value would represent the small sum of $250,000 as Mr. Hayes' investment in the Universal

Trade Association. And it looked to me nothing more or less than that Mr. Hayes had gone into this scheme for personal gain only, and not for the interest of the druggists nor for the carrying out of the plan which he had in view.

MR. CORCORAN: I wish to say that Mr. Hayes appeared in Kansas City before a meeting of the druggists there, and the druggists were very much taken with his plan and proposed to introduce it there and then, and but for my personal solicitation that they be a little more cautious about it, would have endorsed it at that time. I caused them to let it alone until after this meeting and I promised to bring back information and then they could act. I also hoped that we would be able to find out something through the drug journals, and I wish to say right here that I hope the drug journals will do all they can to inform the druggists of this country whether it would be well to go into this matter or not.

Mr. Ebert requested to be excused from service on the committee of three appointed by the chair to draft a resolution regarding action on the universal trade interests, and Mr. Cook was appointed in his place.

The secretary here read the report of the committee upon the question of free alcohol, which upon motion of Mr. Ebert was received.

August 14, 1895.

To the American Pharmaceutical Association:

Your Committee, appointed by resolution of the Association last year to wait on the Secretary of the Treasury, at Washington, and lay before him the action of the Association on so much of the "tariff bill" of the last Congress as provides free alcohol for use in the arts, and so on, submit this report:

On the first of October the full Committee called on Mr. Carlisle and placed in his hands a certified copy of the following resolution:

"The American Pharmaceutical Association, at its forty-second annual meeting, now being held at Asheville, N. C., having carefully considered the action of Congress in enacting legislation exempting alcohol used 'in the arts or in medicinal or like compounds' from internal revenue tax, as prescribed by Sec. 61 of 'An act to reduce taxation, etc.', known as 'The Tariff Bill' of the last Congress; and being convinced of the impossibility of regulating and controlling the use of alcohol in the broad sense in which such exemption might be construed, therefore earnestly and unitedly protest against any interpretation of such action except as follows, to wit:

"That the payment of rebate on the internal revenue tax on alcohol under Sec. 61 of said Act be confined to alcohol used in the manufacture of those products in which the alcohol used is so changed as to lose absolutely its chemical and physical properties, including the classes of chemical compounds known as the ethers, chloral and chloroform, and in the manufacture of such alkaloids and chemicals as may be specified by the Secretary of the Treasury."

With the resolutions we also presented a printed list of the names of the members of the Association.

We found Mr. Carlisle quite willing to hear from our Association, the only organization that could represent the thousands of retail pharmacists in the United States whose interests were to be very materially affected by this legislation.

He informed us that he had given audience to representative men from all branches of trade likely to be affected by the use of free alcohol, but had not learned from any of them of a practical method of executing the law formulated in Section 61, and that Congress having failed to make proper provision for its execution, there appeared to be nothing to do but await the action of the next session.

However, the Secretary explained to us that he had as yet reached no final decision on the subject, and that when one was made it would be promulgated either through the press or in some other way that all interested might be made acquainted with its character.

This very pleasant interview closed after a further exchange of views between the Secretary and the members of the Committee as to the difficulties attending a proper execution of the laws so that neither the revenue of the Government should be defrauded nor the interest of the smallest manufacturer suffer.

The Secretary's decision in the matter was made public in the following letter:

TREASURY DEPARTMENT, OFFICE OF THE SECRETARY,
Washington, D. C., October 6, 1894.

Hon. J. S. Miller, Commissioner of Internal Revenue:

Sir: Your communication of yesterday, in reference to the execution of Section 61 of the Act of August 28, 1894, and advising me that, for the reasons therein stated, you are unable "to prepare any set of regulations which would yield adequate protection to the Government and the honest manufacturer without official supervision, which has not been provided for by Congress," is received. I have also given much attention to the subject, and have fully considered all the arguments and suggestions submitted by parties interested in the execution of the section of the statute referred to, and have arrived at the conclusion that, until further action is taken by Congress, it is not possible to establish and enforce such regulations as are absolutely necessary for an effective and beneficial execution of the law.

You are, therefore, instructed to take no further action in the matter for the present.

Respectfully, J. G. CARLISLE, *Secretary.*

W. E. CURTIS, *Assistant Secretary.*

And now, after the lapse of another year, during which a session of Congress has met and adjourned, the question of free alcohol remains in abeyance.

In the meantime many who use alcohol in the arts or in medical compounds are adopting such measures as will aid them in recovering the revenue tax, should the courts decide that the government is bound to refund this tax, notwithstanding the failure of the Secretary to prescribe the regulations for its repayment.

Respectfully submitted,

W. S. THOMPSON,
CHAS. CASPARI, JR.
CHARLES E. DOHME.

Mr. Ebert moved that the report be adopted.

Seconded.

MR. HECHLER: Before that motion is put I wish to inquire, if the report is adopted, if it carries out the wishes or any form of action of this Association against free alcohol.

THE CHAIR: There is no recommendation attached to the report. I think that is a matter for you to decide here.

MR. HECHLER: Did not the Association at its last meeting from some misunderstanding adopt a motion declaring against free alcohol at Asheville?

MR. EBERT: No, sir, it has done no such thing.

The question was then called for upon the motion to adopt the report, and was carried.

Mr. Fennel moved that this Section re-affirm the resolutions adopted by the Association at its meeting at Asheville last year.

Seconded.

MR. HECHLER: I hope this motion will not prevail. Now, Mr. Chairman and members, I wish to say pretty nearly the same that I said last year at Asheville; I hope you won't be rash; I hope you will not be led by a few radicals who probably cannot see that this will be a great injustice to you eventually if this matter prevails. I hope it will not prevail. I want to say that in our country we have a great opportunity for manufactur-

ing chemicals which we import now from abroad, if we receive free alcohol such as Congress defined in its action two years ago, and for which we have clamored for the last twenty years. We have petitioned our Congressmen time and time again to give attention to that one portion of the internal revenue act, and to give us free alcohol for physicians and manufacturing chemists. Now let us bring it in and see if it is going to do any injustice or harm to us. For instance, Mr. Ebert raises the question that every poor pharmacist would have to have a storekeeper put in his store. I am surprised at Mr. Ebert if he cannot see any further than that. There can be a central laboratory put in a city, controlled by the retail pharmacists, and a storekeeper put there, and let that laboratory make the alcoholic preparations for all the pharmacists of the city. If there is a college of pharmacy in the city the students can be employed in that laboratory and given experience in that way. Can you elevate pharmacy better in any other way? This will give the students something to do, which has been entirely taken away from you. (Applause.)

MR. GREVE: I regret that I have not heard this disucssion, but from what I have heard of it, it seems to me that if this motion prevails, as Mr. Hechler says, I will have to quit business. I am making my own fluid extracts, tinctures and other preparations, but I do not make them in sufficient quantities to enable me to pay for a United States storekeeper, nor do I wish to go into a company in Cincinnati that makes those things. I want to make them in my own laboratory, but I do not see how it is possible until we have entirely free alcohol, or all pay tax.

MR. EBERT: I did not intend to say anything unless I was mentioned. (Laughter.) It has been known in the Association that Mr. Ebert usually comes around once a year and says, "I told you so," and I do not want to be in a position to come around in a year from now and say, "I told you so." Mr. Hechler's theory is very nice, but I want to go out of the drug business when pharmaceutical students of a college make preparations for me. The accusation has been made that we have clamored for free alcohol for over twenty years: I defy any one to show where the American Pharmaceutical Association has placed itself on record as asking for free alcohol. We as individuals may have done so, but this Association has never done it. I want to say to you, gentlemen, if the law as it is framed is carried out, it is the death-knell to the art of pharmacy in this country. (Applause.) We do not want to petition Congress for free alcohol unless we ask for free alcohol for all the people of this country, and not for druggists, or any part of them. There is nothing in this world that makes so many criminals as class legislation. Do you think it possible that without supervision I can have a barrel of tax-free alcohol in my place of business, and another barrel upon which I have paid the tax, and that Ebert would be honest enough to sell constantly from that upon which he has paid the tax, and use the other only for legitimate manufacturing purposes? I want to say to you that I am not honest enough for that, and I do not want the government to make a criminal of me by such improper legislation. This is why I am opposed to free alcohol for special classes. I cannot afford the expense of a storekeeper at five dollars a day and five dollars a night to stay in my store and watch that barrel of alcohol, and thereby compel me to be an honest citizen. I assure you that when we ask for free alcohol from the government, the government may allow it, but it will also regulate the use of it, and the outcome will be as in the fable of the frogs. "You have asked for a king, and he has been given to you, and you will have to pay the expenses." Therefore, the resolution as passed at our last annual meeting is a just one, so far as the chemical manufacturer is concerned, so that he can compete with the foreign manufacturer; but so far as the pharmacist is concerned, until there is free alcohol for every body, do not let us ask it for ourselves and for those manufacturers who will wipe us out of existence.

MR. HECHLER: Mr. Ebert may convince me yet if he answers the question satisfactorily, How will free alcohol wrong every pharmacist in the country?

MR. EBERT: Simply that it will prevent the pharmacist from making the simplest preparation. He cannot make spirit of camphor. How can I make spirit of camphor, when the manufacturer that has a laboratory and gets free alcohol, because he can afford to pay for the supervision, can make this camphor for less than I can buy the alcohol for?

MR. THOMPSON: I believe the Association in this action last year at Asheville did not intend to put this on record, nor did it put itself on record as opposing the use of free alcohol for the retail druggist; but it did go on record against the law which made no provision so that the retail druggist might avail himself of that free alcohol law, the intended enforcement of which would put free alcohol only in the hands of the larger manufacturer. That is the part. It is the law we are opposing—the manner, and not the provisions of free alcohol—and I believe a resolution of this kind would perhaps better express the feeling of this Association upon this matter:

"That this Association in its action at Asheville last year on the question of alcohol does not intend to say that the retail druggist is not in favor of free alcohol, whenever a law is passed that provides the giving to him of this free alcohol on such terms and conditions as he can make use of."

I offer this as a substitute to the pending motion.

Seconded.

THE CHAIR: It seems to me that you could dispose of that question a great deal quicker and better by taking the same course as on the previous subject. I think if three were to get together you would be able to work out a plan that would fit all ideas on that subject. If I remember correctly last year the question referred to medicines alone; the Association said nothing about alcohol for the arts and mechanical purposes. They did not object to free alcohol in that line, but they drew the line on medicines, as I understand it. I was not present, and therefore I do not know.

MR. RYAN: If I am in order, I would move that a committee of three be appointed by the Chair to consider the resolution presented by the committee and the substitute resolution, and report to this Section, and that all of these resolutions be referred to that committee.

This motion was seconded and carried.

The Chair appointed as such committee Messrs. Hechler, Fennel and Cook.

Mr. Mayo offered the following resolution governing the reading of papers at this Section, being the same resolution as heretofore adopted by the Scientific Section, which, upon motion, was unanimously adopted:

GENERAL RULE FOR GUIDANCE OF THE SECTION ON COMMERCIAL INTERESTS.

No author shall be allowed more than fifteen minutes for the reading of any one paper, save by unanimous consent. If any paper requires more than fifteen minutes for presentation, the author shall be required to present it in abstract, which may not occupy more than fifteen minutes.

In presenting papers, preference shall be given to those the authors of which are present.

The committee shall distribute, at the first general session of the Association, all papers which are in print, and shall, at the earliest practicable time, post in a conspicuous place a bulletin stating when the several papers are to be presented.

The Secretary read the report of the Committee on the Universal Trade Association, as follows:

Your Committee, appointed to take into consideration the discussion on the subject of the plan of the Universal Trade Association, beg leave to report that we believe it was originally designed for a money-making scheme, which we condemn. However, we are disposed to believe that there may be some merit in the plan, but we would caution the retail druggists of the country to let the plan alone until it shall be in the hands of representative pharmacists, and the manufacturers approve of and consent to put the plan into operation.

(Signed,) HENRY KLOTZ,
C. C. CORCORAN,
T. B. COOK.

Upon motion, the report of the committee was adopted as read.

Mr. Quandt moved that a Nominating Committee be appointed to select a Chairman, Secretary and Executive Committee of five for the ensuing year, such committee to be composed of one member from each State present at the annual meeting.

MR. LEO ELIEL: I would like to make a few remarks, and as this will be about the last opportunity I shall have during the session of the Commercial Section, I would like to let loose right now. The Commercial Section of the American Pharmaceutical Association is a sort of an after-birth, resulting from the death of the National Retail Druggists' Association, which, you will all remember, was organized on the sky-rocket order in 1883, and since that time we have met every year and have done a great deal of talking, but we have virtually accomplished nothing. The reason we have accomplished nothing is because we never had any definite plan to work on. The trouble with us now and in the past, is that we have had too many plans, and I would like to outline a little plan for this Section, and I would like to see the plan as I outline it adhered to, and I believe if that is the case we may be able to have more satisfactory results in the future. Our plans have always embraced too much. We have tried to do too much, and the result has been, we have not accomplished anything. Now this cut-rate problem has taken up a great deal of time. If it is desired by this Section to take that up, I would like to outline a little plan by which we can get right to the point on short order. That is, if we will only organize, and whatever we resolve to do here, attempt to carry out when we go home. We come here and we resolve to do this, and we resolve to do that; when we get home we do not do it. In saying that, I desire to a certain extent, to exclude myself, because I try to live up to the resolutions adopted at these meetings. When we know that a jobbing house will sell to a cutter, and do so knowingly, if we would withdraw our patronage from that jobbing house, and make it known among our fellow druggists why we withdrew it, we could soon bring that jobbing house up with a sharp turn. If we know that a manufacturer of pharmaceutical preparations violates ordinary business rules, by simply withdrawing our patronage from that establishment and making known to our fellow-pharmacists why we do so, we will soon bring them around to listen to our terms. If we frown down and work against any proprietary preparations which the proprietor sells direct or allows to be sold to people that are known cutters, those proprietors will soon come to our terms. That is the whole thing

in a nut-shell. Let us work on that line. Let us get down to the first principle. This is the plan that I laid down on the organization of the National Retail Druggists' Association, but the so-called "Massachusetts Plan" swallowed up everything else. The Massachusetts men at that meeting were in a large majority, and nothing else would do but that, and the result we have before us. At that time it could have been controlled very nicely by such action as I have been outlining now, and suggesting from year to year, and, gentlemen, it is not too late to do it yet, if you can do it in the right manner and in the right spirit. Let us organize with this object in view. Let us protect ourselves by standing by each other in these things. I can cite you hundreds of cases of establishments that some of you are doing business with, who are violating the ordinary rules of business every day. I, for one, have withdrawn my patronage from a number of large establishments because I knew they were violating ordinary business principles, and if we all did that we would be better for it; for after all, it is nothing but money these establishments are working for. We are virtually nothing; the pharmaceutical press is virtually in the hands of the large manufacturing establishments. They dare not publish any charges against these houses, and we have no official organ. There is not a pharmaceutical journal in this broad land that dares publish anything against these establishments, simply for fear of losing their advertising patronage. I say this openly and above board, without fear of contradiction from any representative of a pharmaceutical journal, and I say it without malice and without any reflection upon the action of the papers.

MR. MAYO: Since Mr. Eliel has challenged the pharmaceutical press, I cheerfully take it up. If a retail druggist can furnish to us satisfactory proof of bad faith on the part of he manufacturers, we will very cheerfully publish it, and I can say that not only for my own paper, but for three others who will very cheerfully do so, notwithstanding the advertising patronage.

THE CHAIR: I think Mr. Eliel will find his ideas outlined in the first set of resolutions drawn by the Committee of nine, but you must read them between the lines. You will find there the points which you have made against them.

MR. ELIEL: I have not heard that report.

THE CHAIR: That is your misfortune. To facilitate matters, I would like to appoint some of those committees that have been acted upon, but I would prefer to have time to look into it very carefully and present them at the General Session. I do not think there will be any objection to that, and in the absence of this special committee on alcohol we will proceed to the election of officers of this Section. We can go at it in any way you like, and the meeting is now in your hands.

MR. RYAN: If nominations are in order, I nominate the present Chairman to succeed himself. He has done very active work this year, and I think he should be retained in the chair. I nominate Mr. George J. Seabury, of New York.

MR. EBERT: I am in favor of rotation in office. We have just had a gentleman come before this Section and tell us we have not done anything in times gone by. I hope this Section will take the gentleman at his word and elect him Chairman of this Section, and that is Mr. Leo Eliel, of Indiana. I want to see him put there in a position where he can do something.

MR. ELIEL: I respectfully decline. I believe in rotation of office, too. I was Chairman of this Section once before, and I couldn't do a single thing.

As there were no further nominations for Chairman, upon motion of Mr.

Thompson, the Secretary was instructed to cast the unanimous ballot of the Section in favor of Mr. Seabury for Chairman.

MR. SEABURY: Gentlemen, I do not think it is necessary for me to give you another address. I gave you one. (Applause.) But I will admit I did at first resolve not to accept the Chairmanship again, for the reason that I think I have done my work about as well as I knew how. If I have forgotten anything, I am willing to learn; but in order to put this Section on its feet and in good running order, I will consent to be your Chairman, one year more, and after that I will retire. (Applause.) But at any time there is a breach in this Section, and you cannot find anybody else to try to put hydrocarbon on the walls, all you have got to do is to call on me, and I will be at your service. (Applause.)

Nominations for Secretary will be in order.

For Secretary, Mr. Corcoran nominated Clay W. Holmes of New York, and upon motion of Mr. Ryan, the nominations were closed and Mr. Holmes was declared the unanimous choice of the Section for Secretary.

MR. HOLMES: Gentlemen: I have made so many bows in New York State, that now I have got away from there, I feel like listening to others. I assure you my interests are very deeply enlisted in this Section, and I shall be glad to do anything in my power. I may have more time than some others, and if the Association will provide funds for doing missionary work, I will see that the missionary work is done. (Applause.)

For members of the Executive Committee, Mr. Cook nominated W. M. Sempill, of Illinois; Dr. Stewart nominated W. S. Thompson, of the District of Columbia; Mr. Mayo nominated Mr. Cameron, of New York; Mr. Ryan nominated George McDonald, of Michigan; Mr. Ebert nominated Leo Eliel, of Indiana; a member nominated E. L. Scholtz, of Colorado; Mr. Mayo nominated Mr. Dimmitt, of Kentucky.

Messrs. Thompson, Eliel and Cameron having withdrawn, the Chair announced that the remaining candidates were Messrs. Scholtz, Sempill, McDonald and Dimmitt.

Upon motion of Mr. Thompson, the Secretary was instructed to cast the the ballot of the Section in favor of the first three as announced—Messrs. Scholtz, Sempill and McDonald, which was unanimously adopted.

The Committee appointed to report a resolution on the question of free alcohol made the following report:

Your committee appointed to consider the resolution of Mr. Fennel, and the substitute offered by Mr. Thompson, beg leave to report that they believe that this Section should endorse and re-affirm the action taken at the Asheville meeting.

Signed,

CHAS. T. P. FENNEL,
THOS. P. COOK,
G. L. HECHLER,
Committee.

Upon motion of Mr. Ryan, the report of the committee was adopted.

Upon motion of Mr. Mayo, the resolution on alcohol, passed last year and read at this meeting, was reaffirmed.

Mr. Corcoran offered a resolution that this Section should request the Council to allow it at least two sessions at all future meetings of the Association.

Seconded and carried.

Mr. Holmes moved that the Council be requested to set aside the sum of two hundred dollars for the use of this Section during the coming year, so that the Section may use so much of that sum as is found necessary to carry out the plans suggested at this meeting.

Adopted.

Upon motion of Mr. Ebert, the vote was reconsidered and the Secretary instructed to refer the matter to the general meeting of the Association, and ask that $200 be set aside for the purpose named in the original motion.

MR. EBERT: I move that the thanks of the Section be returned to the retiring officers, and also the officers elect (as they are the same), for their services in connection with the work of the Section.

Seconded and carried.

Upon motion of Dr. Stewart, the Section adjourned until the next annual meeting.

MINUTES

OF THE

SCIENTIFIC SECTION.

FIRST SESSION—SATURDAY MORNING, AUGUST 17.

The first session of the Scientific Section was called to order by Chairman A. R. L. Dohme, with G. B. Kauffman as Secretary.

Mr. Good occupied the chair while Chairman Dohme delivered the following:

ANNUAL ADDRESS OF THE CHAIRMAN.

Gentlemen: The eighteenth century, as it drew to its close, witnessed the birth of chemistry—was there ever a more promising child and a more brilliant increase in the family of sciences? Whence sprang this precocious and wonderful infant? From pharmacy, its mother then and protectress ever since. Chemistry owes a great debt to pharmacy, for many of those pristine disciples of her teachings, such as Scheele, Liebig, Proust, Klaproth and others, began their career in pharmacies. It was because pharmacy was then purely empirical that chemistry, the science upon which pharmacy rests and depends, soon outran her parent. By lending her scientific spirit and results to her good mother, chemistry has endeavored to repay her debt of filial gratitude, and is to-day lending such aid to her sturdy parent that the latter has become rejuvenated, and, after shedding her nineteenth century skin, deigns to again catch up to the rapid pace set by her daughter.

Yes, gentlemen, the scientific investigation of the many unsightly drugs that we must now handle, will in due season bring to light many beautiful, pure chemical substances that will replace their mother drugs, and, because they are pure and hence always the same, will enable that promising science, pharmacology, to render scientific medicine and prescriptions possible. Many conservative pharmacists and physicians will incredulously smile when they hear this, but, gentlemen, it is bound to come, because the progress of science knows no obstacle, and the fields of the vegetable drugs will present the widest and most fertile prospect to the scientific investigator of the twentieth century.

More and more chemists every year are putting their energies in the chapters of pharmaceutical chemistry, and no number of the "Berichte der Deutschen Chemischen Gesellschaft," "Annalen der Chemie," "Journal of the Chem. Society," "Journal für Praktische Chemie," "Chemical News," etc., now makes its appearance that does not contain some valuable contribution to pharmaceutical chemistry. It is not, gentlemen, the synthetic products that I refer to, for they belong to the province of pure chemistry,

but to the thorough investigation of the natural constituents of drugs, such as alkaloids, glucosides, acids, etc., and derivatives of these. Does anybody present here know exactly what digitalis contains, or ergot, or cascara sagrada? If so, he would render this Association, and the pharmaceutical and medical world at large, a most invaluable service if he would unbosom himself. Exact, modern, persevering investigation has not yet been applied to them, and the best we can say of any of them is, "probably about."

But one by one the more prominent drugs are being taken up by expert hands, and it will not be many meetings hence that one of my successors in this position will be able to report to you that digitalis contains so and so, and that such or such and such substances are the active principles of the drug. We will then know that digitalis contains such and such substances, possessed of such and such properties, and having such and such effects upon the human body. We will know that certain of them possess therapeutically valuable properties, possibly of different natures, and that others are therapeutically valueless. The result will be that instead of prescribing and swallowing these whenever digitalis is prescribed, we will prescribe and swallow only the one or the ones, as the case may be, that we know will produce certain desired effects. When this is done for all drugs, we will have placed pharmacy on a very high and enviable seat among her sister sciences. So much in anticipation; now for the retrospect. What has the past year added to our store of facts?

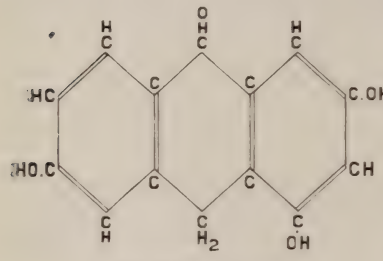
The discovery of Argon by Lord Rayleigh and Prof. Ramsay and of Helium by the latter should perhaps rank first as the most momentous discoveries of the year. The former as the most inert substance known, not uniting even with halogens, was discovered as a result of a very slight discrepancy noticed by Lord Rayleigh in weighing what he knew to be pure nitrogen. He passed the weighed quantity of pure nitrogen over heated magnesium, which absorbs it readily to form magnesium nitride, and he found, to his great surprise, that something to the extent of one per cent. was left that could not be made to unite with the magnesium. It was made in quantity, found to be in the air, and its spectrum, atomic weight, etc., determined. The atomic weight was found to be forty, the same as that of calcium, and its molecule was found to be monatomic. Although so indescribably inert, Argon threatens to cause an upheaval in the chemical world, for there is no place for it in the periodic system of the elements, a system which, as we all know, underlies our entire chemical fabric, and has been productive of more numerous and valuable results and researches, than any other theory ever advanced in chemistry. We must await the result of a better acquaintance with this new element before anything definite can be stated.

Helium, also a colorless gas, is one of the elements known to be in the sun, but never before found upon the earth. In making an analysis of a Norwegian mineral "Cleveite," Prof. Ramsey obtained this gas together with argon upon treating the mineral with sulphuric acid. The reports upon it are only vague as yet, although the spectroscope shows that its lines correspond to certain of the solar lines that have never yet been obtained from elements on the earth. Statements that helium is the basis of all elements are purely gratuitous and without foundation in fact. The scientific world awaits with bated breath further researches on helium and argon, as these elements possess properties that are new to chemists and different in nature from the chemical properties of any known class of substances.

The most actively worked field of investigation for the past year or more is that of the essential oils, which thanks to the great work of Prof. Wallach of Göttingen, and Prof. Baeyer of Munich, has at last been so worked up that daylight has been caused to shine upon many of them and they are all being gradually studied and classified. The essential oils consist mainly of terpenes and camphors, are not only common substances and widespread in nature, but present to the chemist a most fascinating field of work on account of their subtle nature and ready manipulation and change. When we realize that prac-

tically all terpenes and camphors have the same empirical formulas, $C_{10}H_{16}$ and $C_{10}H_{16}O$ respectively, and number many while possessing such markedly different properties, we can appreciate the interest they present to the skilled investigator.

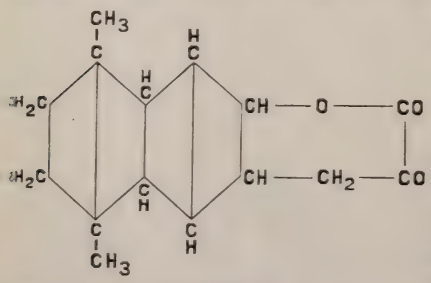
Prof. Tschirch and his school of Berne have begun what promises to be a most interesting piece of work—the examination and origin of plant secretions. He has already taken up the balsams of Peru and tolu as well as Gum Galbanum, and we will soon know all about these apparently unapproachable and chemically uninteresting though pharmaceutically valuable substances. He finds that besides containing benzyl benzoate and benzyl cinnamate, they contain the benzoates and cinnamates of a peculiar class of substances which he calls tanniferous resin-alcohols, and which are the true resins of these balsams. He has obtained thus from Peru balsam, peru-resino-tannol, and from tolu balsam, tolu-resino-tannol, as he terms them, in pure crystals, and has determined their properties, composition, etc.



TRI-OXY-XANTHINE.

Kostanecki has made synthetically gentisic acid and gentisin and found that the former is hydroquinone carbonic acid. By heating this with phloroglucine he obtained gentisein, which is 1–3–7 tri-oxy-xanthine and the monomethyl-ester of this is gentisin. Beckurts has devised a method of determining theobromine in cocoa, and Palladino has isolated a new alkaloid from coffee—caffearine $C_{14}H_{16}N_2O_4$, which is a narcotic, and in doses of two decigrams has been found to kill frogs. In the field of alkaloids, there has been the usual activity. Prof. Fischer, of Berlin, has made a successful synthesis of caffeine, starting from urea. The process is rather complicated, including as many as six or more intermediate stages, but he thinks it will prove of value commercially. This is perhaps the most important discovery in the field of alkaloidal chemistry.

E. Schmidt has isolated a new alkaloid from Goldenseal, which he calls canadine, and which he found is tetrahydro-berberine. Freund is busy with aconitine and thebaine, and we probably will soon know exactly what these substances are and be able to recognize them and determine them. Knorr is still busy with morphine, which he has definitely determined is a derivative of phenanthrene. Koenigs is plodding along steadily at quinine, and his work on this alkaloid will soon fill an entire book. There is no doubt that he knows more about the constitution of quinine than any other man living. Miller is endeavoring to settle what cinchonine is. Petit and Polonowsky are doing the same for eserine, and Pinner has practically shown that nicotine is methyl B-pyridyl pyrrolidine. The substance until now called emetine has been shown to consist of emetine and cephæline by Paul and Cownley, and the first results of the determination of the constitution of emetine have been published by Kunz-Krause and contradicted by Paul.



SANTONIN.

Klein has determined the formula of santonin, Goldsobel that of ricinoleic acid, the active principle of castor oil, and Taverne has shown that convolvulin is a glucoside of methyl-ethyl-acetic and oxy-pentadecylic acids. Kobert has isolated cannabindon, a red syrupy liquid from cannabis indica, and shown that the narcotic effect of this drug is due to this substance.

Griffith and Ladell have isolated a ptomaine from the urine of grippe patients, which is toxic and produces high fever.

Ciamician and Silber have shown that cotoin is mono-methyl-benzoyl-phloroglucin and Lerchsenring has separated in pure form from Kousso flowers kosin, protokosin and kosotoxin, of which the latter only is an active principle. It has been shown that the orchid Nigritella, which grows wild on the slopes of the valley of Lauterbrunnen in Switzerland, and perfumes the air for miles around with the odor of vanilla, does actually contain vanillin and heliotropin.

A rather unexpected discovery is the fact that hydrogen dioxide, when free from alkalies and any metallic impurities, can be distilled undecomposed even at high temperatures. We have no doubt all read with much pleasure the interesting and valuable work of Emil Fischer on the sugars, by which this great investigator has so clearly shown what these complex and chemically unapproachable substances are. It is of value to remark that he has recently announced a general method of producing glucosides synthetically from glucose and the respective acid or alcohol. This may open the door to the synthesis of the glucosides of some substances that are unpalatable in their present form, and also be the cause of their activity being increased, because their glucosides when broken up in the stomach or intestines cause them to act in a nascent state.

It is of interest to note that some of the prominent German Universities are now endowing chairs of pharmaceutical chemistry, as they no doubt recognize the great benefit that the development of this branch of chemistry may have upon the nature of the medicines taken by the people, as well as the discovery of potent specifics against disease. There is a demand for this chair, as the number of students that evince a desire to work in this field of pharmaceutical chemistry is continually increasing, if one may judge by the current literature of the day. Prof. Erich Schmidt, of Marburg, has been called to the newly-constituted chair of pharmaceutical chemistry of the University of Berlin, but has not accepted, for the reason that there are no facilities for good work offered there, whereas at Marburg he has everything as he desires it.

In our own country competition for positions is not so great as to stimulate men to become investigators and indulge to any extent in original research, and, with few exceptions, pharmaceutical schools do not educate men up to the standard of undertaking original work. But, gentlemen, the noble spirit and ambition which inspired our own Procter, Parrish, Mahla, Maisch, Squibb, Prescott, and many others of the founders and older members of this Association, and brought forth many valuable contributions to pharmaceutical science that found recognition in every part of the civilized world, is still alive among the host of younger members of our Association, and I know they will not fail to be worthy of the founders of this Association.

Yes, we have good workers and well-trained and educated chemists and pharmacists here, and there can be no doubt that the standards of colleges of pharmacy are being and will continue to be raised in this country, so that when a man has the inclination and ability, he can fit himself for doing the very best of research work in pharmaceutical chemistry. We must develop the departments of pharmacology and physiological chemistry besides pharmaceutical chemistry in our colleges, because they are valuable and necessary adjuncts to a thorough and successful training in pharmacy.

German schools of pharmacy appreciate and have acted upon this, and we should not lag behind. What has helped along the great German chemical industries during the last thirty years, and placed them so very far ahead of all other countries, is the great work of the German Chemical Society, founded by the late lamented father of these industries, August Wilhelm von Hofmann. This great German Chemical Society, whose "Berichte" penetrate wherever the word chemistry is known, and which numbers above 3,000 members scattered all over the globe, has so stimulated men to work and work and work in chemical research that every branch of the science has become over-crowded

with workers, and this surging mass of keen, well-trained and highly-educated men has by sheer competition in excellence and pride in their Association and their country, forced the chemical industries thereof so far to the front that they have practically distanced all competition. This is laudable, this is commendable on the part of the Germans, this spirit to excel and to push their society and their country forward by pride and their energy, and there is no reason why we should not develop this same pride in our Association and country.

Why cannot we make our Proceedings become so valuable and so interesting to all pharmacists and chemists the world over, that they will be anxious for the day when the next current number arrives, and pay willingly a reasonable sum to receive it? Why cannot this American Pharmaceutical Association occupy the place in the pharmaceutical world that the German Chemical Society does in the chemical world? We have the talent and ability in this country, but it is latent and needs fostering and encouraging. We cannot reach the goal at one jump, but we should strive to reach it, for it is the most commendable and desirable one this Association can look forward to. How can it be accomplished, or rather how can we make a great step towards its accomplishment? Let me make a suggestion.

I would strongly recommend as a most desirable step for this Association to take, the appointment by this Association of a committee of three, consisting of the Permanent Secretary, the Chairman of the Scientific Section, and the Chairman of the Committee of Revision of United States Pharmocopœia, to be called the Committee on Pharmaceutical Research Work, with power to increase its membership indefinitely by calling for volunteers for work among the members of this Association. That the three gentlemen mentioned, after the committee is formed, act as a council in directing and apportioning out the work of research and investigation in the various branches of pharmacy, and annually make a full report to the Association at its meetings. That, inasmuch as this work will entail some expense, this Association could in no more profitable and satisfactory way make use of a portion of its income, than by agreeing to expend annually a certain sum of money, derived from its invested funds and income, to defray the expenses of this committee. The amount to be expended every year would have to be regulated by the condition of the treasury and be appropriated by the Council of the American Pharmaceutical Association, after consulting with the Committee.

If our Association as such is to publish scientific and valuable knowledge for the benefit and enlightenment of its menbers and the scientific world at large, and I believe no nobler purpose could be engraved upon its escutcheon, how better can this be accomplished than by the systematic persistent work of an active committee capably directed?

In conclusion, gentlemen, I wish to take this occasion to thank my fellow committee members, and the members of this Association, for their kind assistance in enabling me to so pleasantly and agreeably perform the duties of my position.

MR. GOOD: Gentlemen, you have heard the reading of the address of the chairman of this Section. What is your pleasure in regard to it?

MR. SAYRE: I move that this address be received and referred to the Committee on Publication, and at the same time I should like to have a Committee appointed to consider the suggestions therein contained.

MR. GOOD: Your motion then is to receive the Chairman's address and refer it to a committee of three. Those in favor of that motion will signify it by saying aye; contrary, no. The motion is carried.

The Chairman of the Section, Dr. Dohme, then resumed the chair and said:

Next in order are reports of committees. I think we have a committee on the subject of Indicators appointed last year by the Chairman, Professor Sayre, which Committee consisted of Messrs Kebler, of Philadelphia, Caspari and Dohme, of Baltimore, and which committee has increased its membership by requesting the kind services of Professor Prescott, of Ann Arbor, and Prof. Lloyd, of Cincinnati. The work of the Committee on Indicators has been very extensive, but I think the importance of the subject justifies the amount of work put upon it, and I hope that you will listen to the report with due interest. I will request Prof. Caspari to present the report.

Mr. Caspari: The report of this committee is rather voluminous, and I doubt very much whether it will be proper to read the whole of it, as it will take up too much of your very valuable time; therefore, the Committee has made an abstract of its report, so as to give the Association what it considers a very fair idea of the work done. Otherwise we would have to ask for an hour or an hour and a half to read the whole report.

Mr. Caspari then gave an abstract of the following report:

REPORT OF THE COMMITTEE ON INDICATORS.

Mr. President and Members: Your Committee appointed at Asheville, N. C., to consider the question of indicators in the titration of alkaloids, met soon after its appointment, and considered its line of action. The chairman secured some good Brazil wood and sent a sample to Dr. Rice, who pronounced it genuine. A number of samples of methyl orange were also secured and carefully tested as regards their sensitiveness. After considerable trouble one was found that responded quite favorably. Each step, in the plan determined on, was carefully investigated and verified before being submitted to the workers. It was not an easy matter to enlist workers; only three, besides the committee, could be found willing to coöperate in the work. All things being in readiness, a sample of each of the following substances, was sent to each worker: Brazil wood, methyl orange, pure quinine, crude morphine, powdered nux vomica, ipecac root and belladonna leaves, fluid extract of nux vomica and ipecac root. The samples were uniform in every respect, being prepared by the chairman himself. Accompanying the samples were the following instructions:

The object of this work is to decide on the indicator best suited and most practical for titrating the various alkaloids with volumetric acid solutions.

INDICATORS TO BE EMPLOYED.

Brazil Wood. Prepare the solution according to the directions of the United States Pharmacopœia of 1890. Employ ten drops for each titration.

Cochineal. Prepare according to the directions of Sutton's Volumetric Analysis—Latest Edition. Use five drops for each titration.

Hæmatoxylin. The coloring principle of hæmatoxylon in crystalline form. (Merck.) Dissolve one gram in 100 C.c. of alcohol. Use three drops for each titration.

Litmus. Prepare according to Sutton. Employ ten drops for each titration.

Methyl Orange. Dissolve one gram in one liter of water. Use five drops for each titration.

Phenolphthalein. Dissolve one gram in one liter of 50 per cent. alcohol. Use five drops for each titration.

PREPARATION OF SOLUTIONS.

Prepare normal solutions of sulphuric acid and potassium hydroxide. Employ well-boiled water for all work. Use phenolphthalein as indicator.

From the above solutions, respectively, prepare a decinormal acid solution and a cen-

tinormal alkaline solution. Titrate 10 C.c of the decinormal acid solution with the centinormal alkaline solution, employing the several indicators, and report the number of C.c. of alkaline solution required with the various indicators.

DIRECTIONS FOR OPERATING ON SAMPLES.

Quinine.

It is very desirable that some work be done on some quinine on hand before taking up the sample.

Into a 100 C.c. graduate place 2 grams of quinine, dissolve in alcohol and make up to 100 C.c. with alcohol. Each 10 C.c. contains 0.2 grams of quinine.

To 10 C.c. of the quinine solution, in a 250 C.c. beaker, add decinormal acid solution to slight excess, rotate well, allow to stand a few moments, wash the sides of the beaker down well with distilled water. Titrate the excess of acid back with the centinormal alkaline solution. It is well to make two or more titrations in every case, with the same solution and indicator, by adding to the solution just finished 1 C.c. of decinormal acid solution and retitrating with the alkaline solution, taking finally the average reading. Report the percentage of pure quinine represented by each indicator. Use 0.0377 as decinormal factor.

Crude Morphine.

Place 2 grams of the morphine into a 200 C.c. beaker, add 75 C.c. decinormal acid solution, warm the contents of the beaker on a water bath, agitating occasionally until the morphine is dissolved. The beaker is then removed, cooled, and its contents transferred to a 100 C.c. graduate: rinse the beaker carefully with several portions of water, transferring the several portions to the graduate; finally make up to 100 C.c.

Each 10 C.c. contains 0.2 grams of crude morphine and 7.5 C.c. of decinormal acid solution. Titrate back the excess of acid with centinormal potassium hydroxide. Several titrations are recommended, as above. Report the percentage of pure morphine repsented by each indicator, using 0.0303 as decinormal facter.

Fluid Extracts of Ipecac and Nux Vomica.

10 grams of the fluid extract are diluted with 10 grams of distilled water in a 250 C.c. flask, 25 grams of chloroform, and 75 grams of ether added, the vessel securely stoppered, and well agitated. Add 5 grams of 10 per cent. ammonia water and agitate the mixture frequently during half an hour.

a. When the mixture has completely separated, pour off 50 grams of the chloroform-ether mixture into a flask or beaker, evaporate the solvent on the water bath, add 10 C.c. of ether and evaporate again. Dissolve the varnish-like residue in 15 C.c. of alcohol with heat, add water to slight permanent turbidity, add indicator and slight excess of acid solution and re-titrate with centinormal alkaline solution.

b. When the mixture has separated entirely, pour off 50 grams into a separatory funnel, treat at once with 20 C.c. of acidulated water: after thorough agitation and complete separation, remove the 20 C.c. of water into a second separatory funnel. Repeat the above operation twice more with 15 C.c. of acidulated water. The acidulated water in the second separatory funnel is rendered alkaline with ammonia water, the alkaloid removed successively with 20 C.c., 15 C.c., and 15 C.c. of a mixture of three parts (by volume) of chloroform, and one part of ether. Collect the chloroform-ether mixture in a tared flask and distil off the solvent. The varnish-like residue is twice treated with 8 C.c. of ether, evaporated on a water-bath, finally dried on a water bath and weighed. The varnish-like residue is now dissolved in 15 C.c. of alcohol, with the aid of heat, then proceed as in "*a*" above. Report the percentage of emetine, both gravimetrically and volumetrically, as represented by the various indicators, using 0.0254 as the decinormal factor.

Report the percentage of the alkaloids in nux vomica, both gravimetrically and volumetrically, using 0.0364 as decinormal factor.

Powdered Nux Vomica, Ipecac and Belladonna Leaf.

Place 10 grams of the dry drug into a 250 C.c. flask, add 25 grams chloroform, 75 grams ether, stopper flask securely, agitate well for several minutes, add 10 grams of 10 per cent. ammonia water; the suspended powder separates almost immediately, and the alkaloids are dissolved; agitate frequently and well during one hour. On adding 5 grams more of ammonia water and shaking well, the powder agglutinates into a lump, the liquid becomes clear after standing a few minutes, and can be poured off almost completely. Treat 50 grams of the chloroform-ether mixture from the ipecac and nux vomica, according to processes "*a*" and "*b*," belladonna according to process "*b*." Report the percentage of alkaloid in each, as obtained by the several indicators, using 0.0289 as the decimal factor of belladonna leaves.

The reports of the several workers are given in their own language as nearly as possible.

IN THE ALKALIMETRY OF ALKALOIDS.

By ALBERT B. PRESCOTT, from the work of C. DEJONGE and W. SCOTTEN: A contribution to the report of the Committee upon Indicators, appointed at the Asheville meeting.

The standard solution used in this work, from which the exact strength of the other volumetric solutions were determined, was a decinormal solution of sulphuric acid, duplicate samples of which were accurately estimated separately by Mr. DeJonge and by Mr. Scotten, by precipitation as barium sulphate, the necessary precautions being taken with regard to complete precipitation, etc. The average result of both was taken as the factor.

The measuring apparatus, the burettes and graduated cylinders, were calibrated to find the necessary factor for correction in volumetric work. The method of calibration was as follows: Two burettes were chosen having the same linear measure; one of these was filled exactly to the zero mark with distilled water and ten cubic centimeters delivered into a tared weighing flask and weighed; then the next ten or fifteen cubic centimeters of the water were drawn in the same manner, and so on until the entire capacity was tested. With this burette the other burette and apparatus were compared by running into each successive portions from the calibrated burette and taking careful readings after each addition. All readings from the burette were made without the use of a float, reading each time from the bottom of the meniscus, the eye being kept at right angles to the reading. In all cases the burette was allowed to drain thoroughly before reading.

The Indicators themselves, upon which the work was done, were those proposed by the Chairman of the Committee, and were prepared according to his directions. The quantity of indicator liquid so prepared, to be used in each titration governing the intensity of color at the end reaction, was at first trials always the quantity proposed by Mr. Kebler; and only in the case of litmus, as stated below, was it afterwards found advisable to vary from the quantity suggested. The materials of the indicators were obtained as follows: The Brazil wood was received from Mr. Kebler; the cochineal was a good article from the market; the hæmatoxylin was Merck's crystalline, and a good article; the litmus was from the laboratory stock; the methyl orange was received from Mr. Kebler; the phenolphthalein was obtained from Merck.

From the first control titrations, made on well boiled and cooled water, with the various indicators alone, it appeared that cochineal, methyl orange, hæmatoxylin and Brazil wood are especially sensitive to alkalies.

Litmus did not give satisfactory results when only ten drops of the indicator were used.

Twenty drops gave satisfactory results unless the solution was too highly colored, as in ipecac. The normal salts of strychnine, quinine, morphine and other strong bases are neutral to litmus; therefore these alkaloids can be titrated with litmus as an indicator. But some of the more feeble alkaloids, as caffeine, narcotine and theobromine, have no action on litmus, and their salts behave towards it like a corresponding amount of free acid.

All of these indicators give a color with both acids and alkalies, each indicator producing a color peculiar to itself. The change from one color to another is very delicate, and any interference, such as a deep-colored solution, reflection of light from the dark walls of a room or a dark background, are serious objections and have to be avoided in some way. For these obvious reasons duplicate samples were titrated with the same indicator, using the duplicates for colorometric comparison with each other.

The precaution was adopted of providing a background and sideground of white for the duplicates undergoing titration. This was done by setting the two-arm burette-stand into a box-shaped recess, open in front, and lined throughout with sheets of filter-paper, of white surface not lustrous, the base of the burette-stand being covered with the same.

In the final titrations reported, Messers. DeJonge and Scotten made joint observations of the end reaction, so that each result is in a sense the mean of two personal results, or we may say that the personal error of these two workers was divided by two. In the table below * are given the results of Messrs. DeJonge and Scotten, in both the gravimetric and the volumetric processes specified above.

In titrating samples of quinine, the fluorescence caused by an acid solution of quinine with oxy-acids was a serious objection. Even after titrating several samples it was only with difficulty that we were able to decide just where the first change in color took place. The use of decinormal hydrochloric acid proved more satisfactory, and is recommended when the alkaloids quinine and quinidine are to be titrated.

From the various samples of nux vomica we were unable to see any advantage gained by process "b," except when litmus was used as indicator. Emetine, the principal alkaloid of ipecac, on exposure to light and air soon turns yellow, and solutions to be titrated from both processes, "a" and "b," have a yellow color, consequently no advantage is gained by process "b." Litmus cannot be used in titrating samples of ipecac, because of this yellow color. Hæmatoxylin was found the most satisfactory, in general, as an indicator in titrating the various alkaloids.

School of Pharmacy, University of Michigan, June, 1895.

By Alfred R. L. Dohme: I enclose below the results of my experiments with indicators, which I cannot exactly regard as satisfactory, inasmuch as the divergence in many cases is so marked:

The sulphuric acid I used was standardized by Weinig's method, and phenolphthalein was used as a standard in fixing the strength of the potassium hydroxide solution.

The indicators were prepared according to directions, litmus being rendered neutral by special treatment with acetic acid to destroy the carbonates. This discrepancy, to begin with, is marked and unexpected.

Titration is a matter of personality, the personal equation playing a large rôle. No authorities agree as to the exact limit, each using his own judgment. I think it is correct to titrate to the point where the beginning of a different color from the starting color is developed. From the standpoint of sharp change of color, or what we may call sharp indication, hæmatoxylin stands first, followed closely by Brazil wood. From the standpoint of indicating most alkaloid, methyl orange stands first, seconded by litmus.

The good showing of methyl orange is due, I think, to the increased alkalinity as com-

* Table given at the end of the report.

pared with the other indicators, since it only required 93.15 C.c. $\frac{N}{100}$ KOH to give the same results as those obtained with 100 C.c. in the case of phenolphthalein and 95.23 C.c. in the case of Brazil wood. I cannot recommend methyl orange for this reason, and for the reason that its indication is poor and slow. Why methyl orange indicated so much for fluid extract of nux vomica and ipecac by process "a," and so little by process "b," is a question. It may have been due to slips in the manipulation, or to the fact that method "b" does not agree well with methyl orange.

For the reasons that their indication is sharp and their *general* average showing, as to amount indicated, is good, I consider Brazil wood and hæmatoxylin the most desirable and correct indicators. Of these two, Brazil wood is preferable as to amount indicated, and hæmatoxylin as to sharpness of indication.

By J. U. Lloyd: Prof. Lloyd has limited his work entirely to the preparation of the standard solutions and experimentation with quinine and morphine. He has sent the Chairman a most valuable list of data, part of which only will be given in this report, reserving the remainder for future use.

The solutions of the indicators were prepared exactly according to directions given.

The decinormal acid solution was prepared by properly diluting strong acid, and the strength of the dilute acid determined and adjusted by means of pure Na_2CO_3 prepared from Merck's Sod. Bicarb. puriss., and using methyl orange as indicator.

The centinormal caustic potash was prepared by boiling Potass. Carb. with milk of lime, diluting with water, and titrating and adjusting with the previously prepared decinormal acid solution, using methyl orange as indicator.

The following experiments were undertaken with two different lots of caustic potash, that is, containing different amounts of carbonates A and B. Although considerable care was taken to exclude any carbonate from the caustic potash, the formation of some carbonate during the preparation of the centinormal solution could not be entirely obviated. The second lot (B) contained more carbonate than the first (A). The centinormal caustic potash solution was kept in a bottle, protected from carbonic acid, and siphoned off when required.

With the above solutions the following work was done: The two standard solutions were carefully titrated against each other employing the several indicators. Of all these indicators, hæmatoxylin seems to be the most suitable or sensitive for that purpose. Brazil wood also is very suitable.

In titrating anhydrous quinine, Brazil wood seems to be the most suitable indicator, the others being unsatisfactory. When using the decinormal factor 0.0377 for the hydrated quinine sent, the results were far too high, demonstrating that the quinine had lost some of its water of crystallization. Brazil wood and hæmatoxylin appear to be the best suited for hydrated quinine. With the other indicators the changes are very indistinct, and it becomes very difficult to exactly define the point where the coloration changes.

With morphine, Brazil wood, cochineal and methyl orange seem to be the most satisfactory, and hæmatoxylin, if six instead of three drops are used, promises to be useful, giving a distinct change in coloration, from bright yellow to reddish brown.

By Lyman F. Kebler: The standard solution employed in this work was prepared from data secured by the several processes; titration against pure, anhydrous sodium carbonate, Weinig's method, and precipitation as barium sulphate. After some experimentation, I found that Weinig's method gave me the most satisfactory results. The method is simple, easily executed, and gives very concordant results—three points that would recommend any method. The following are the results obtained by the several processes, from an approximately normal sulphuric acid solution:

Indicator.	No. of C.c. of acid solution required per 10 C.c. of $\frac{N}{1}$. Na_2CO_3 solution.	Gms. of SO_3 in 10 C.c. of the acid solution.
Hæmatoxylin	9.54	0.4192
Phenolphthalein	9.45	0.4216
Methyl Orange	9.50	0.4211
Brazil wood	9.50	0.4211
Litmus	9.50	0.4211
Weinig's Method	....	0.4247
Barium Sulphate Method	....	0.4200

Due precaution was taken to boil the solution thoroughly with the indicators requiring it. After preparing the solution, Mr. La Wall, my associate, took up the samples and assayed them, independently using the same apparatus and solutions that I had used; his results are given in the table below.

The titrations were all executed before a large window, employing white back ground. When a doubt existed as to end reaction, a solution was prepared possessing the desired tint, and the end reaction carefully compared with the standard tint. An important question arises in this connection, what is a standard end reaction tint for an indicator? In my work with Brazil wood I titrated from yellow to onion red, the purple ultimately fading to this; cochineal from yellow to bluish-red; haematoxylin from yellow to brown orange, the delicate purple in time fading to this; litmus from red to onion-red; methyl orange from red to straw-yellow.

In order to arrive at a standard and absolutely reliable end reaction tint, it will be necessary to work on some alkaloids especially crystallized for this purpose, and employ measured quantities of liquids. If these conditions are observed, we may safely take as the normal tint the one prevailing at the exact point of neutralization.

The work thus far is only a beginning, and may be considered preliminary work. I intend to extend my work in several directions that have already suggested themselves. The indicators, thus far used in the work, having given fairly satisfactory results under the conditions, are haematoxylin, Brazil wood and cochineal. For certain work haematoxylin stands first, but I am in favor of cochineal for an all-round indicator. Mr. La Wall joins me in this conclusion.

TABLE OF RESULTS OBTAINED BY DIFFERENT EXPERIMENTERS.

NAME OF INDICATOR.	Number of C.c. of $\frac{N}{10}$ KOH Solution required to neutralize 10 C.c. of $\frac{N}{10}$ H_2SO_4 with the several indicators.						Per cent. of Pure Quinine in sample of Quinine sent.					Per cent. of Pure Morphine in Crude Morphine.				
	Prescott	Lloyd		Dohme	La Wall	Kebler	Prescott	Lloyd	Dohme	La Wall	Kebler	Prescott	Lloyd	Dohme	La Wall	Kebler
		A.	B.													
Phenolphthalein	102.40	99.88	103.89	100.00	101.80	102.00	—	—	—	—	—	—	—	—	—	—
Brazil Wood	97.60	98.90	100.42	95.23	99.56	100.00	113.60	110.78	104.24	99.00	101.97	100.23	98.80	98.62	99.23	98.47
Cochineal	97.20	98.23	99.69	94.74	100.58	99.80	—	112.70	104.99	105.60	102.54	101.42	100.14	99.18	100.14	99.53
Hæmatoxylin	96.80	97.98	99.80	94.70	99.86	100.00	114.41	112.15	105.27	99.81	103.37	100.19	100.27	98.48	99.08	97.59
Litmus	102.00	98.13	102.95	95.43	99.70	99.60	112.30	104.77	104.99	101.80	103.55	101.13	98.04	98.62	99.50	98.93
Methyl Orange	96.70	98.89	99.69	93.15	92.67	98.53	117.05	107.60	—	—	123.27	101.43	99.59	98.58	102.10	100.20

TABLE OF RESULTS OBTAINED BY DIFFERENT EXPERIMENTERS.—*Concluded.*

NAME OF INDICATOR.	Per cent. of Alkaloids in Nux Vomica. By Direct Titration.				Per cent. of Alkaloids in Nux Vomica. Determined Gravimetrically.				Per cent. of Alkaloids in Nux Vomica. Titration after Gravimetric Determination.			
	Prescott.	Dohme.	La Wall.	Kebler.	Prescott.	Dohme.	La Wall.	Kebler.	Prescott.	Dohme.	La Wall.	Kebler.
Brazil Wood	2.20	2.97	2.04	2.58	2.03	....	2.94	3.00	2.03	2.11	2.37	2.37
Cochineal	2.32	3.04	2.64	2.69	2.98	....	2.86	3.10	2.49	1.80	2.42	2.39
Hæmatoxylin	2.33	3.05	2.18	2.24	3.08	....	2.88	3.11	2.54	1.91	2.23	2.27
Litmus	2.18	2.97	2.38	2.34	2.02	....	2.93	3.05	2.02	2.15	2.55	2.37
Methyl Orange	3.01	3.06	3.02	3.64	2.89	....	2.93	3.02	2.78	2.19	2.65	2.61
	Per cent. of Alkaloid in Ipecac Root, by Direct Titration.				Per cent. of Alkaloid in Ipecac Root, Gravimetrically.				Per cent. of Alkaloid in Ipecac Root, Volumetric after Gravimetric.			
Brazil Wood	2.34	2.60	2.46	2.57	2.53	....	2.58	2.60	2.07	2.00	2.36	2.35
Cochineal	2.31	2.56	2.59	2.49	2.55	....	2.63	2.68	2.37	2.03	2.52	2.33
Hæmatoxylin	2.31	2.57	2.48	2.44	2.62	....	2.58	2.68	2.37	2.03	2.35	2.33
Litmus	*	2.65	2.55	2.57	—	....	2.62	2 60	*	2.05	2.70	2.25
Methyl Orange	2.30	2.75	2.95	2.30	2.59	....	2.66	2.63	2.32	2.05	2.89	2.61
	Per cent. of Alkaloids in Belladonna Leaves, by Direct Titration.†				Per cent. of Alkaloids in Belladonna Leaves, Gravimetrically.				Per cent. of Alkaloids in Belladonna Leaves, Volumetric after Gravimetric.			
Brazil Wood	....	....	....	....	0.27	....	0.26	0.20	0.13	0.15	0.19	0.15
Cochineal	....	....	....	....	0.27	....	0.28	0.20	0.17	0.13	0.24	0.14
Hæmatoxylin	....	....	....	....	0.27	....	0.27	0.22	0.13	0.11	0.21	0.13
Litmus	....	....	....	....	0.25	....	0.24	0.18	0.14	0.14	0.20	0.15
Methyl Orange	....	....	....	....	0.28	....	0.25	0.20	0.19	0.19	0.23	0.20
	Per cent. of Alkaloids in Fluid Extract of Nux Vomica, by Direct Titration.				Per cent. of Alkaloids in Fluid Extract of Nux Vomica, Gravimetrically.				Per cent. of Alkaloids in Fluid Extract of Nux Vomica, Volumetric after Gravimetric.			
Brazil Wood	1.48	1.61	1.62	1.70	2.04	....	2.02	2.00	1.41	1.22	1.70	1.61
Cochineal	1.75	1.50	1.77	1.76	2.53	....	1.97	2.01	1.78	1.44	1.74	1.64
Hæmatoxylin	1.38	1.48	1.61	1.67	2.15	....	2.01	1.96	1.38	1.33	1.58	1.50
Litmus	1.56	1.56	1.69	1.72	2.45	....	2.02	1.94	1.31	1.28	1.59	1.55
Methyl Orange	2.28	1.88	2.01	1.90	2.18	....	2.01	1.94	2.25	1.32	1.92	1.82
	Per cent. of Alkaloid in Fluid Extract of Ipecac Root, by Direct Titration.				Per cent. of Alkaloid in Fluid Extract of Ipecac Root, Gravimetrically.				Per cent. of Alkaloid in Fluid Extract of Ipecac Root, Volumetric after Gravimetric.			
Brazil Wood	1.84	1.85	1.74	1.78	1.94	....	1.75	1.86	1.57	1.70	1.67	1.67
Cochineal	1.92	1.88	1.79	1.80	1.67	....	1.76	1.80	1.52	1.65	1.72	1.72
Hæmatoxylin	1.87	1.87	1.77	1.86	1.95	....	1.74	1.74	1.62	1.67	1.65	1.65
Litmus	*	1.73	1.79	1.74	1.88	....	1.73	1.80	*	1.73	1.66	1.60
Methyl Orange	2.05	1.93	2.00	1.95	1.87	....	1.74	1.79	2.01	1.29	1.92	1.88

* Unsatisfactory. † When the ether chloroform solution extracts much coloring matter, as chlorophyll, it is impossible to titrate the residue dsrect.

The above table certainly furnishes food for thought. The committee regrets exceedingly that the work was not completed by several of the workers enlisted. The work laid out by the Committee was probably a little excessive, requiring at least seventy-six assays, after having prepared all the solutions and executed considerable preliminary work to become acquainted with the various end reactions and manipulations.

The Committee arrives at the following conclusions:

1. That the future work in this direction should include the following indicators; haematoxylin, Brazil wood and cochineal. The results with litmus and methyl orange are so varying and unreliable that further work on them is time wasted.

2. The assay of fluid extract of nux vomica, fluid extract of ipecac root and powdered ipecac root is satisfactorily executed by process "a;" belladonna leaves give very satisfactory results with process "b." Powdered nux vomica will bear more work before a safe conclusion can be drawn.

3. The cinchona alkaloids cannot be titrated with oxy-acids on account of the fluorescence produced.

4. A comparison of the gravimetric and volumetric processes shows that the latter does not suffer by rigid comparison.

5. That this work be considered only an introduction to more extended investigations, and it is hoped the Association will consider this valuable line of work with due deliberation.

Respectfully submitted,

LYMAN F. KEBLER, *Chairman*,
ALFRED R. L. DOHME,
CHAS. CASPARI, JR.

MR. SAYRE: I wish to rise and ask that the thanks of the Association be voted by this Section to the Committee for the work done by them, and also ask that the committee be continued.

MR. HALLBERG: I second that motion, and add this amendment, that their report, either now or at such time as the Committee thinks proper, be referred to the Committee on the Revision of the Pharmacopœia.

Mr. Sayre signified his acceptance of the amendment.

MR. SIMON: In addition to that motion, I would like to add one statement, namely, to the effect that the expenses of this committee have not been paid by the Association, and as the expenses have been somewhat considerable, I move, as an amendment to the motion, that this Section recommend to the Association the allowance of a reasonable amount for the payment of the expenses of this Committee in the way of materials used for their investigations, at least in the future. We cannot expect to have the members of the Committee spend their own money in this direction, in addition to devoting their time to the work.

Seconded by Mr. Sheppard.

This amendment was also accepted by Mr. Sayre, and the question recurring upon the original motion as amended, was put and carried.

THE CHAIRMAN: Before proceeding to the next business, which is nominations of new officers, the chair would select as the Committee on the Chairman's address, Messrs. Sayre, Prescott and Diehl.

Nominations of officers being in order, Mr. Ryan nominated for Chairman Prof. S. P. Sadtler, of Pennsylvania.

Seconded.

MR. GOOD: If it is not unusual to continue a member in office for two years, I would like to place Dr. Dohme in nomination.

Seconded.

THE CHAIRMAN; Are there any other nominations? If not, nominations for Secretary are in order.

For Secretary, Mr. Hallberg nominated the present incumbent, G. B. Kauffman, of Ohio.

Seconded.

There being no further nominations made, the matter was closed until the next session, and the Section proceeded to the reading of papers as follows:

EXAMINATION OF ELM BARK, FLAXSEED AND MUSTARD FOR STARCH.*

BY J. U. LLOYD.

Owing to the alterations in our library building, necessitating the storing of its contents, it is impossible for me to refer to the literature connected with this subject. References thereto will perhaps be added later.

The immediate object is a consideration of the subject of starch in connection with the aforenamed substances, a subject now of great importance to Ohio pharmacists. The question is, does elm bark contain starch at all? Do flaxseed and mustard, if free from starch-bearing seeds, ever contain starch, and is it practical in commerce to apply the rigid tests of the Pharmacopœia to ground flaxseed and powdered mustard?

ELM BARK.

"The inner bark of Ulmus fulva, Michaux (nat. ord. Urticaceæ). In flat pieces, varying in length and width, about 3 Mm. thick, tough, pale, brownish-white, the inner surface finely ridged; fracture fibrous and mealy; the transverse section delicately checkered; odor slight, peculiar; taste, mucilaginous insipid."—United States Pharmacopœia.

It will be observed that no chemical test is given by which we can be governed concerning adulteration of the powdered bark. In referring to other authorities, little information is to be found, and even their brief statements concerning the presence of starch do not agree. Since the larger share of elm is consumed as powdered elm, and since druggists do not powder it, but rely altogether on trade millers, the subject of simple tests and rules as to purity are now, in Ohio at least, of great importance.

In the face of conflicting reports made by advocates who claim that elm bark does not contain starch, and those who claim that it does contain starch, these results are offered simply as voicing the result of my personal experimentation on this now important subject.

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* For valuable assistance in detail work, the thanks of the author are extended to Dr. Sigmond Waldbott.

If a slab of dried elm bark be split longitudinally and the exposed edges be moistened with very weak iodine tincture, a light purplish blue color follows, which disappears quickly. If the bark be previously moistened with dilute sulphuric acid the blue color is quite permanent. The same is true when it is moistened with a dilute solution of iodine in iodide of potassium, acidulated with sulphuric acid.

Ten specimens taken by me at random from a lot of Wisconsin bark, and others from Kentucky and Ohio, demonstrated that all of them responded to the test, and I have found none that did not do so, although some specimens of bark contain more starch than others. If a thin shaving not of the the inner side of a slab of elm, be dropped into a dilute solution of iodine, in iodide of potassium made acid with sulphuric acid, the shaving will usually turn blue or become streaked with blue, although as the inner surface of the bark is often free from starch, the shaving must be from beneath the surface. In this connection it should be added that this starch-free layer is of varying thickness, sometimes being a mere film, again (seldom) forming the bulk of the bark. Under these conditions it is to be presumed that enough starch must be present in powdered elm to make it respond to the iodine test.

To Detect Starch.—Powder the elm bark, and thoroughly mix one gram with 100 C.c. of water by rubbing in a mortar, the water being gradually added, then boil.

To a 2 C.c. iodine test solution U. S. P., add 8 C.c. 10 per cent. sulphuric acid.

Mix 1 C.c. of the iodine mixture with 8 C.c. of the cold mucilage, a clear, quite permanent blue color will be produced. If iodine tincture without acid be added to the mucilage, the blue color is developed, but disappears quickly. If the mucilage is to be made of the whole bark, shave it tranversely into thin shavings, put 1 gram into a capacious mortar, and rub constantly with 100 C.c. of boiling water, gradually added, until a thick mucilage results.

The coloration that results in presence of too much iodine is not bright blue, for if an excess of iodine is used, a shade of purple or brownish-yellow results. It is essential that no excess of iodine be employed, and when the yellowish shade results additional mucilage must be added to counteract the excess.

Ash.—Incineration of seven specimens showed the presence of 8.62 per cent.–9.13,–9 22,–7.64,–8.10,–8.08,–10.10, ash, the average being 8.69; observed maximum 10.10, observed minimum 7.64. Each of the foregoing results is the average of several incinerations of the same specimens of bark, which agreed very closely.

Summary.—Elm bark contains starch enough to respond to the iodine test, and this fact should be stated in the Pharmacopœia. It should also be stated that when powdered elm is boiled with water, the mucilage if

acidulated with sulphuric acid, on the addition of dilute iodine solution, should turn blue and retain its color for some time. Elm bark contains so little starch that in my opinion a comparative test can be easily devised that will determine any fraudulent admixture of starch, and in justice to the trade a method to detect added starch should be recorded in the Pharmacopœia. The Pharmacopœia should also limit the amount of ash.

Elm bark contains a natural constituent capable of disturbing the iodide starch test, for if a blue solution, made by adding freshly prepared iodide of starch to water to distinct coloration, be mixed with its bulk of mucilage of elm, the mixture is immediately decolorized. The blue color is partly restored by the addition of dilute sulphuric acid.

According to preliminary experiments, this phenomenon is most probably due to the presence of both tannin and an organic calcium compound which may be isolated from the bark, Report on these constituents is reserved for the future.

FLAXSEED.

"The seed of Linum usitatissimum, Linné, (nat. ord, Lineae)."

About 4 or 5 Mm. long, oblong-ovate, flattened, obliquely pointed at one end, brown, glossy, covered with a transparent, mucilaginous epithelium, which swells considerably in water; the embyro whitish, or pale greenish, with two large oily, plano-convex cotyledons, and a thin perisperm; inodorous; taste mucilaginous, oily and bitter.

Ground linseed (linseed meal, or flaxseed meal) for medicinal purposes, should be recently prepared, free from unpleasant or rancid odor When extracted with carbon disulphide, it should yield not less than twenty-five per cent. of fixed oil.

The filtered infusion of ground linseed, prepared with boiling water and allowed to cool, has an insipid, mucilaginous taste, and should not be colored blue by iodine T. S. (absence of starch.)—United States Pharmacopœia.

In this connection as no exception has been made to the statement concerning the proportion of oil, that substance is herein neglected.

As regards the starch, the statement has been made that immature flaxseed contains that substance, a point that I have had no opportunity to verify. With a view to establishing the fact as to whether commercial flaxseed contains starch, a number of samples of selected flaxseed were tested. In no case could starch be found.

Upon testing the ground flaxseed of the market, however, it was found that every specimen examined responded to the starch test, some contained starch in very large amounts, and it was not without surprise that the fact was shown that the ground flaxseed sold to my own establishment had been grossly adulterated and contained at least twenty per cent. of starch. Neither was it less of a surprise to find that flaxseed ground by responsible parties and offered as pure, and believed by them to be pure, gave a de-

cided blue coloration and would not conform to the demands of the Ohio Pure Food and Drug Commissioner. Upon investigation it was found that flaxseed is often mixed with such cereals as rye and wheat, and that growing fields of flax are often largely contaminated with volunteer cereals. In addition, the seed is often put into meal and flour sacks and becomes impure thereby. The farmer does not, cannot separate these foreign seeds, the oil miller cares little, if at all, for the contamination, and hence, since linseed oil makers are the parties who produce the ground flaxseed of commerce, and grind for market the quality of seed they press for oil, it is readily seen that commercial ground flaxseed cannot be expected to withstand a searching starch test. Of course, these remarks do not apply to mixtures designed intentionally as adulterations. That flaxseed can be cleaned in quantities is, however, shown by the fact that in wholesale seed stores in Cincinnati I have succeeded in picking up flaxseed free from starch-bearing contaminations.

It is my opinion that if a universal demand arises for pure flaxseed meal it will be followed by a trade supply that will conform to the starch test of the Pharmacopœia, but naturally at increased price.

The pharmacopœial test is, I believe, objectionable by reason of the unnecessary direction to filter the infusion, which owing to its mucilaginous nature is troublesome, to say the least. It may also be made more specific as to details, and owing to the growing importance of this subject nothing should be left to conjecture.

The test I apply to it is as follows:

Boil 1 gram of ground flaxseed with 20 C.c. of water and cool.

Mix 0.2 C.c. test solution of iodine, U. S. P., with 10 C.c. of ten per cent. sulphuric acid.

To 8 C.c. of the flaxseed mucilage add 2 C.c. of this iodine compound, when if starch is present, a blue coloration will result. As little as 0.5 per cent. of starch is indicated by a strong reaction.

An admixture of but 0.3 per cent. of starch is easily recognizable by this iodine test. Even the presence of as little as 0.1 per cent. of starch may also be recognized by making the mucilage more concentrated, using only 10 C.c. of water instead of 20 C.c. to 1 gram of flaxseed.

MUSTARD.

"Free from starch."—United States Pharmacopœia.

If commercial mustard seed be examined it will be found, as a rule, mixed with foreign seeds. Among these are to be found starch-bearing seeds, especially the seed of Chenopodium (American Wormseed), this being often present and containing much starch.

If this mixed mustard be powdered and tested by the usual iodine method with small amounts of iodine, it will be found even in the presence of much starch paste that the reaction will be indistinct or evanescent, if it

develop at all. This is due to the action of iodine on volatile mustard oil. In this connection it may be said that when a few drops of oil of mustard are stirred into an excess of iodized starch mixture, the blue coloration will soon be removed.

As a result of a series of experiments that were made in order to arrive at an expeditious method to eliminate the iodine absorbing power of mustard oil prior to the testing for starch, the following process gave the greatest satisfaction :

Put into a large test-tube ½ gram of the ground mustard seed, add 8 C.c. of water and 1 C.c. iodine test solution, U. S. P. Boil until the brown color has disappeared. Decant, cool the decanted liquid, and add by means of a pipette *one drop* of iodine test solution. If as little as 0.1 per cent. of starch is present, a distinct and quite permanent blue or greenish blue color appears.

If the principle of boiling the infusion of mustard seed with the iodine solution is not adhered to, the starch reaction will be evanescent, even in the case of gross admixtures of flour.

As the Pharmacopœia demands that no starch be present (and I can find none in pure mustard seed), it should be shown explicitly how the presence of starch can be determined.

GENERAL SUMMARY.

Elm bark contains starch.

Flaxseed and mustard, both white and black, free from admixture, do not contain starch.

The presence of small amounts of some foreign seeds that are difficult to separate, and of grains of cereals, are common in both flaxseed and mustard, and generally carry sufficient starch to make the powder respond to starch tests if properly applied.

In the case of elm bark, the blue coloration disappears very quickly unless acid is added. After this blue color has faded, it can be partly revived by the addition of sulphuric acid.

With mustard, the blue color also disappears, if an insufficient amount of iodine is added, because the latter is readily assimilated by the volatile oil of mustard. Even in the presence of a large amount of starch, sulphuric acid does not revive the blue coloration ; but previous heating with an excess of iodine test solution saturates the mustard oil, and renders the starch reaction quite permanent.

With flaxseed, the blue coloration of starch remains for some time ; but, in contradistinction to the behavior of mustard, an excess of iodine must be avoided, in order to obtain the pure blue color of iodide of starch. In commerce ground flaxseed is not, so far as I know, supplied starch free, but it can be easily obtained without any intentional admixture. Ground mustard now and then is pure, but, owing to unintentional contaminations,

usually responds to the starch test, if properly applied. It can easily be purchased free from adulteration, but not necessarily entirely free from starch-bearing seeds.

In no case is it desirable to attempt to filter any of these mucilages, the pharmacopœial directions to this effect being in my opinion objectionable.

MR. FENNEL: I am glad that this subject has been brought up by Professor Lloyd, because in my official capacity as Chemist of the Ohio State Pure Food Commission I did not intend to touch upon that subject, for the reason that whatever I said would be misconstrued. Now the Commission has partly to rely upon certain authorities: first, the United States Pharmacopœia; and next to that we have to take the Dispensatories. Looking among the authorities, especially on elm bark, flax and mustard, subjects that have been brought before the Commission, I could not find a single authority that stated, especially in the case of elm bark, that starch was present, with the exception of one, namely, the National Dispensatory, which stated that occasionally starch granules were found, but not in the inner bark. I have examined the elm bark for starch, but it has always been the ground bark, not the whole. I have endeavored to ascertain, by the conversion of starch into sugar, estimating the quantity of sugar produced, what proportion would be found in the powdered bark. Whenever I got a permanent reaction I found that the difference, if my recollection serves me correctly, was about 60 per cent. in the quantity of sugar produced from the whole bark and the powdered bark; the powdered bark, however, contained the starch. Now, I think the whole bark will indicate, after conversion, about 28 per cent. of sugar, that is, the reducing sugar, while the powdered bark, if adulterated with starch, will indicate as high as 86 per cent. of reducing sugar, a difference of between 40 and 60 per cent. As to flax, I believe the authorities agree that there is starch, and the same with mustard, both black and white. The only trouble we have had is in elm bark. Whatever caused the result found by Professor Lloyd in his investigations, I, for myself, do not believe starch is present. It may be present under certain conditions. As I understand the plant, it has flowers before the leaf appears, and certain actions must take place thereafter. Certainly starch granules must appear at a certain time, which affect the bud essentially and disappear again. Therefore, I am glad Professor Lloyd brought up the subject. If starch be present, it ought to be specified in the Pharmacopœia.

MR. LLOYD: I wish to say that I took it for granted that this deep-blue coloration resulted from the presence of starch. Of course, if the elm bark contains some substance other than starch that will prodvce this chemical reaction, I will admit it was not starch. I am willing to take elm bark found in the market, or specimens brought from Cincinnati, and make the tests here before this body.

MR. SAYRE: I would like to ask how many papers will be presented to this Section.

THE SECRETARY: There are about twenty.

MR. HALLBERG: I have a very brief paper on this same subject, and I would like to have it read.

The Section next listened to the reading of the following paper, which, in the absence of its author, was read by Professor Hallberg:

A METHOD FOR THE ESTIMATION OF STARCH IN POWDERED ELM-BARK.

BY W. B. DAY.

A short time ago, at the suggestion of a friend, the writer undertook a microscopic examination of the powdered elm-bark of the market. Ten samples of powdered and four of ground elm-bark were obtained from pharmacies in this city.

Attention has been called to the fact that this drug is often adulterated with flour, and such proved to be the case, as the microscope revealed in every sample the presence of characteristic granules of wheat starch. As this starch itself rarely occurs in the market, its presence was held to be satisfactory evidence of the admixture of wheat flour.

To determine the amount of foreign starch was the next step—foreign starch, for this bark normally contains starch. H. B. Foote estimates the amount of starch in pure elm-bark at 0.3 per cent. (Pharm. Era, Vol. xiv., p. 43.) While casting about for some method of making this determination microscopically, it was suggested to me that E. B. Stuart, of this city, had, in 1882, devised a method for determining the amount of starch present in the washings from starch-tables, by examining in a cell of known capacity a portion of the liquid containing the starch in suspension, and counting the granules. This method has, to the best of my knowledge, never been published. The idea seemed to be a good one, so I have followed a similar method.

0.1 Gm. of wheat starch was suspended in 10.0 C.c. of syrup. The latter was chosen on account of its viscosity, high specific gravity, and lack of solvent action upon starch. From this mixture the starch did not wholly subside in a week's time. Glycerin diluted with one-fourth its weight of water makes an excellent medium; it has a lower specific gravity but a greater refractive power than syrups.

Having in this manner a known *weight* of *starch* suspended in a known *measure* of *liquid*, it remained only to count the number of starch granules in a definite quantity of the liquid. To this end, a counting apparatus similar to that known as Thoma's Hæmacytometer was employed. This apparatus consists essentially of a cell 0.1 M.m. in depth, and having for its bottom a crossed-line micrometer of an area of a square millimeter and divided into 400 squares. Each square has therefore an area of $\frac{1}{400}$ of a square millimeter, and the cubic contents of the fluid below the cover-glass, and resting upon one square, are $\frac{1}{4000}$ of a cubic millimeter.

In making the examination the lines of the micrometer were blackened with graphite, and the starch, having been evenly distributed through the syrup (there being no objection to stirring or shaking to accomplish this, as the presence of air-bubbles need not interfere with the work), the cell was filled with a drop of the liquid, and the cover-glass put in place. Using a quarter-inch objective, the number of granules in each square was

counted, squares containing air-bubbles being omitted. A mechanical stage is a great help here. By its aid one can readily count the granules in twenty consecutive squares, ranging from right to left, and bring each square directly into that most favorable position, the centre of the field of view.

A count of the *total* number of granules in a 1 : 100 mixture of wheat starch and syrup resulted as follows:

	Average.
1st trial: 24 squares gave 189 grains	7.87
2d " " " " 172 "	7.17

It became necessary here to devise a method of distinguishing quickly between the starch of elm-bark and that of wheat. This is not difficult, as the starch granules of elm-bark are quite small. In four samples of pure powdered bark examined none were found to exceed 5 μ (micromillimeters) in diameter. Wheat starch, as is well known, consists of two classes of granules, the diameter of those of the larger class being about four times that of the smaller. The average measurements are given by Flückiger as 26.9 to 28.0 μ and 6.8 μ respectively.

Size offers a distinction that may be readily applied, and using a micrometer eye-piece all granules of a diameter less than 7 μ were omitted from the count. Examination with the same mixture as employed before, now gave the following results.

	Average.
I. 56 squares gave 63 granules	1.12

Three other mixtures, wheat starch, 1, syrup, 100, gave:

II. 80 squares 85 granules	1.06
III. 200 " 234 "	1.17
IV. 200 " 218 "	1.09

All were from the same lot of starch. Numbers III and IV were stained with five to six drops of a strong potassium iodide-iodine solution, and as this stain was used in subsequent tests, their joint average, 1.13, was taken as a standard.

Determinations of five of the adulterated samples were made and furnished the following results:

Percentage of Admixture of Wheat Flour in Powdered Elm-bark Estimated from Starch Found.

No.	Trial.	No. of granules 7μ or over in diameter.	Estimations. Wheat starch.	Flour.
I.	*a*	72	32.7 per cent	46.7 per cent.
	b	76		
II.	*a*	53	24.0 per cent	34.3 per cent.
	b	55		

No.	Trial.	No. of granules 7′4 or over in diameter.	Estimations. Wheat starch.	Flour.
III.	*a*	67	31.8 per cent	45.4 per cent.
	b	75		
	c	74		
IV.	*a*	52	22.8 per cent	32.6 per cent.
	b	51		
V.	*a*	79	34.3 per cent	49.0 per cent.
	b	76		

200 consecutive squares were counted in each trial.

Admixtures of the pure drug with wheat starch were now made and examined in the same manner. A specimen with *25 per cent.* of *wheat starch* yielded:

a. 200 squares, 57 granules.

b. 200 squares. 53 granules.

Average, 55 granules, $\frac{55}{200} = 0.275$; $\frac{0.275}{1.13} = 0.244$ or 24.4 per cent. Error, 0.6 per cent.

A specimen with 33⅓ per cent. of *wheat starch* yielded:

a. 200 squares, 72 granules.

b. 200 squares, 74 granules.

Average 73 granules, or 33.3 per cent. Error 1 per cent.

A specimen with 25 per cent. of *wheat flour* yielded:

a. 200 squares, 42 granules.

b. 200 squares, 37 granules.

Average, 39.5 granules, or 17.5 per cent. of wheat *starch*. In the latter case, the flour used would contain $\frac{17.5}{25}$, or 70 per cent. of starch. König (Nahrungsmittel, Vol. II, p. 519) gives from 65.88 to 69.30 as the percentage of starch in flour. Allen gives an analysis of fine wheat flour containing 74.3 per cent. of starch (Organic Analysis, Vol. I, p. 36). 70 per cent. was assumed to be correct in making the above estimations.

Mr. H. B. Foote, of Cincinnati, sent me three samples of powdered elm bark obtained in the market there, and practically pure. I mention this only to point out the fact that the pure article may be had if the pharmacist will insist upon it.

In conclusion, I wish to apologize for the insufficient time I have been able to devote to this paper, and to express the hope that the method employed will prove of at least some value to workers along similar lines.

Chicago, Ills., August, 1895.

THE CHAIRMAN: Gentlemen, you have heard the paper; what is your pleasure in regard to it? You can act upon both of these papers together.

A motion was made that the papers be received and referred to the Publication Committee.

DR. WHELPLEY: I would like to call the members' attention to the fact that here we

have an evidence of the progress that is being made in the determination of adulterations. A few years ago considerable reflection was cast upon papers presented to the various Pharmaceutical Associations on account of the fact that the investigators did not distinguish between admixtures and adulterations. Now we are paying more attention to the point of determining whether the presence of the substance is fraudulent or accidental than has been the case in previous years, so that we are progressing in a new direction.

MR. SAYRE: I would like to second those remarks. I remember very well a few years ago in Philadelphia, where it became necessary for me to buy at the very lowest market price a large quantity of ginger for the purpose of making a tincture in large quantity; I thought at that time that as I had a confidential friend in the business I could buy the pure article of him and at a low price. I went into the establishment and found a young man there in charge of the grinding, and asked him if I could get from him an absolutely pure ginger. "Well," he said, "the fact is we don't make it; we have a 'perfectly pure,' the 'strictly pure,' and the 'grocer's pure.' Now," he says, "the 'perfectly pure' contains so much impurities, the 'strictly pure' contains so much impurities, say 10 per cent., and the 'grocer's pure' contains so much impurities, which was the lowest grade, but the 'pure' we have not got." (Laughter.) Now it seems to me that we are working in the right direction. If we are to be looked upon as the dispensers of pure drugs, it seems to me that we ought to fortify ourselves by such methods as we are now pursuing, and we must look to this Association and to this Section for work on that line. And in the same direction I want to say as a member of the Committee on the Investigation of Powdered Drugs, a sub-committee of the Committee on the Revision of the United States Pharmacopœia, there is in that field a very large amount of work to be done. If you look in the last number of the "Journal of Pharmacy," you will there see a method suggested by which the Viburnum opulus and the V. prunifolium can be distinguished in the state of powder under the microscope. Now it seems to me if we are able to do this, we are able to do more than we have done heretofore. We are able to see to-day, under the microscope, whether this substance is powdered senna or powdered digitalis, although they look the same and smell the same, but by putting them under the microscope we can tell which is which and there is no danger of admixture. This is the work we are on to-day, and I hope it will receive no cold blankets from men who prefer to be called extremely practical.

MR. HALIBERG: I want to call your attention to one thing that Mr. Day forgot to mention. I spoke to him about the importance of knowing exactly what he started with, so he got some elm bark and rasped this and obtained the powdered elm bark himself, and from that these observations have been made as a basis.

The question being put upon the motion to refer the papers to the Committee on Publication, the same was adopted. Mr. Sayre then read the following paper:

TARAXACUM ROOT AND TARAXACIN.

BY LUCIUS E. SAYRE.

As a continuation of the investigation mapped out for myself a few years ago in connection with Taraxacum and reported upon in '93 and '94, I desire at this time to present the results of further work during the past winter in the same direction. It may be remembered that an effort has been made to determine the variation in the root at different seasons of

the year, and to determine whether the valuable constituents are to any great extent altered by the application of a low heat such as might be used in drying the fresh drug.

During the past year an effort has been made to determine the nature and characteristics of the so-called bitter principle—Taraxacin—and to this end my investigations have been chiefly directed. The first difficulty in isolating the active principle lay in the separation of it from the extraneous matter with which it is always contaminated when its colorless aqueous solution is evaporated. This extraneous matter was referred to in a former paper (Proceedings of 1893, p. 78) when it was stated that all attempts to obtain the bitter principle in a crystalline form, free from admixture of brownish red extractive, had been unsuccessful, and what was reported as Taraxacin in the analysis was this crude bitter principle containing this extractive.

It seemed impossible to separate the small needle-like crystals from the resin-like globules of other uncrystallizable material seen under the microscope, and whether these uncrystallizable amorphous globules of extractive or the crystals were actually the bitter principle, it was almost impossible to tell. My efforts have been directed towards this particular problem—how to obtain the Taraxacin in the pure state. If it be a crystalline body, how can this body be separated from the above-mentioned amorphous substance or substances ? For help in the work I am indebted to Mr. A. B. Clarke a student in the School of Pharmacy of the University of Kansas.

A record of the work will show probably that a separation of the bitter principle has been accomplished, and in the present paper an attempt will be made not only to show this but to make clear the various steps in the process, so that others may be able to take up the subject or follow the ground gone over, and thus be able to verify or disprove the statements made herewith. At the same time, an attempt will be made to offer a process for the separation of an acrid (?) principle which exists in the root.

In the work during the year the various preparations of the drug were used as starting points, viz., the chloroformic extract, the extract, and the fluid extract. It is unnecessary to take up each one of these divisions in detail and refer to the many failures and the causes of them. Reference will be made to such parts of the work as yielded results, which I desire to record for the benefit of those who will at a future time wish to verify it.

Coloring Matter. A point worthy of note has been hinted at in a former paper, namely, that the root at a certain time in the late fall, seems charged with a coloring matter almost entirely absent at other seasons. On going over this part of the work again this year, I found that the October root was of a much higher color and contained this peculiar coloring principle, which was entirely absent in the root collected in September. This coloring principle was obtained nearly pure by dissolving it from the chloroformic extract with alkaline water and precipitating it from the alka-

line solution with an acid. It is very sensitive to acids and alkalies; with the former yellow and with the latter a deep red color is produced.

Acrid (?) Principle. One ounce of the extract was mixed with clean white sand and dried in an oven at a temperature of 65° C., and powdered. This powdered extract was very hygroscopic, taking up water and becoming caked together when allowed to stand in the air but a short time. The powdered extract was placed in a continuous extraction apparatus and extracted with chloroform for ten hours. The chloroformic extract was nearly colorless. The heat used in the manufacture of the extract seemed to have rendered most of the coloring matter insoluble in chloroform. There was, however, a small amount in solution which became visible upon concentration, and on complete evaporation a yellow mass of pasty consistence remained, having an acrid (?) and very bitter taste. The residue was dissolved in water and one-third of the yellow solution placed in a vacuum desiccator and allowed to evaporate. This gave no crystals, but the residue was highly colored and had an odor resembling caramel. This was again dissolved in water and shaken with absolute ether. The ether was then drawn off, and on evaporation left a residue which was not crystalline but had an intensely sharp acrid (?) taste—not bitter.

Taraxacin. Four ounces of a fluid extract, prepared by repercolation, was diluted with an equal bulk of water and a dilute solution of sub-acetate of lead added until no further precipitation was produced. The precipitate was mixed with water and hydrogen sulphide passed through the mixture, until the lead was all deposited in the form of sulphide. The mixture was then filtered and the filtrate evaporated to dryness on a water-bath. The residue showed no signs of bitterness, making it evident that the bitter principle had not been precipitated by the sub-acetate of lead.

The first filtrate from the precipitate formed by the sub-acetate of lead was freed from lead by passing hydrogen sulphide through the solution, and filtering out the lead sulphide formed. The filtrate was then evaporated to dryness, leaving behind a yellow pasty mass of intensely bitter and acrid taste. The mass was mixed with sand and dried in an oven at 55° C. for three days, but the residue did not dry sufficiently to be powdered. It was divided into small particles and macerated in chloroform. The chloroformic extract on being evaporated left a large crop of crystals nearly free from foreign matter. The residue was very bitter.

This bitter residue gave glucosidal reactions, but when the drug was treated by the lime process for the separation of glucosides, viz., the powdered drug mixed with freshly prepared milk of lime and evaporated to dryness on a water-bath, and the residue extracted with alcohol, no evidence of the bitter principle could be found in the residue after evaporating the alcohol.

Of the processes employed for separating the taraxacin, thus far the one in which the solution, after precipitation with sub-acetate of lead is used,

is by far the most satisfactory; but in any of the processes it is necessary to use a large amount of the drug, as the principle exists in the root in very small quanities—about 0.05 per cent.

It was found during the investigation that the acrid (?) principle existing in the root could be separated from the bitter principle by shaking an aqueous solution of the chloroformic extract of the extract with absolute ether, drawing off the ether and allowing it to evaporate, when a yellowish mass having a very sharp acrid taste remained. This residue dissolved in water and was acid to litmus paper. The relative amount of this acrid (?) principle contained in the drug was not determined, but the percentage is very small.

It is now thought that a plan has been mapped out by which future investigators, using large quantities of the drug, will be able to completely isolate the bitter principle or "Taraxacin" from Taraxacum root, and by combustion determine its ultimate composition. Fifty pounds of the drug have been extracted with chloroform, and during the next winter it is hoped this work will be fully accomplished.

Dr. Dohme read the following paper:

WHAT IS THE PURE ACONITINE OF COMMERCE?

BY ALFRED R. L. DOHME.

As the result of some experiments made some time since on the value of titration with volumetric acid solution as a means of assaying alkaloidal drugs and galenical preparations, a titration of the various well-known pure alkaloids was made in order to substantiate the theory that each cubic centimeter of decinormal acid used in the titration represented so much (a quantity equal to its molecular weight) of each of these alkaloids.* Whereas this work substantiated the theory beautifully, it led to the conclusion that one at least of the alkaloids examined was either not pure or at least very prone to decomposition. This alkaloid was aconitine. As mentioned in that article, it was decided to examine more carefully the aconitines of the market and endeavor to detect if they were or were not pure substances. All the available makes of this market were procured and examined, and the results will follow below. Dr. Martin Freund, of the University of Berlin, was appealed to, and his reply intimated the possibility of a decomposition during the process of titration due to the combined action of heat and dilute acid on the alkaloid. This was not the case however, as heat was not applied during the process of titration in case of aconitine and in all of the experiments tabulated below no heat was applied. Before discussing the results let us inquire as to what aconitine is liable to contain as contaminations. Aconite Root contains the following alkaloids combined with aconitic acid:

* New England Druggist, January, 1895.

CH_2—COOH
|
CH—COOH
||
CH.COOH.
(Aconitic Acid.)

Aconitine—$C_{34}H_{47}NO_{11}$—rhombic tables, insoluble in water, melting point 197–198° C.

Apoaconitine—$C_{34}H_{45}NO_{10}$—crystalline—melting point 185–186° C.

Aconine—$C_{25}H_{41}NO_9$—amorphous—melting point 130° C.

Picroaconitine—$C_{32}H_{45}NO_{10}$.

Picroaconine—$C_{23}H_{39}NO_8$.

Pseudaconitine—needles—$C_{36}H_{49}NO_{12} + H_2O$—melting point 104–105° C.

Pseudaconine — amorphous — $C_{27}H_{41}NO_9$ — soluble in water — melting point unknown.

Aconitine and pseudaconitine are different, because the former yields on saponification benzoic acid and aconine, while the latter yields on saponification veratric acid (dimethyl-protocatechuic acid) and pseudaconine. Aconine, apoaconine and pseudaconine are decomposition products of the corresponding aconitines. This chapter is however quite dark yet and statements conflict very much, so that, as in the case of ergot, every new investigator finds a new alkaloid in the drug and gives it a new name. When Dr. Freund and Prof. Dunstan shall have completed their investigations of this drug it is probable that we will know something definite about it. In order to be able to report upon the aconitines of the market a sample of each was procured in an original package, including the products of Messrs. Rosengarten & Sons, Powers & Weightman, Mallinckrodt Chemical Works, Merck, C. F. Boehringer & Soehne and Duquesnel of France. The color of these products varied from a pure white to a dark cream color, and in consistency from a flaky amorphous to a granular crystalline. They were tested as to their melting points with the following results:

I.*	Melting point,	105°–107°	C.
II.	"	" 180°	C.
III.	"	" 91°–109°	C.
IV.	"	" 83°–97°	C.
V.	"	" 183°–184°	C.
VI.	"	" 195°	C.

I., II., V. and VI. are hence probably made up of one substance, but III. and IV. are unquestionably a mixture of several substances. They were then titrated with decinormal sulphuric acid, one cubic centimeter of this being regarded as representing 0.0645 grammes of aconitine according to the formula for aconitine established by Dr. Freund, which is $C_{34}H_{47}NO_{11}$= 645. If these products were pure aconitine they should have yielded the same amount of this alkaloid as was weighed off and taken to be titrated.

* These numbers have no special reference to the order in which the products are enumerated.

In no case was this found to be true, but instead the following observations were made :

I.	Yielded	10.06	per cent.	more	aconitine	than	was	weighed	off.	
II.	"	10.7	"	"	"	"	"	"	"	
III.	"	11.4	"	"	"	"	"	"	"	
IV.	"	11.3	"	"	"	"	"	"	"	
V.	"	11.8	"	"	"	"	"	"	"	
VI.	"	11.4	"	"	"	"	"	"	"	

This indicates that in all the products there is contained some substance whose molecular weight is less than that of aconitine, and is hence probably a decomposition product of aconitine. The remaining alkaloids of aconite root are too little known to enable one to devise a reliable method of determining them or the aconitine, and as they may all be contained in the sample under examination, and may accompany the aconitine present throughout all its decompositions and changes, all methods of assay can at best be approximations until we do know more about them. Assuming that aconitine, *i. e.*, acetyl-benzoyl-aconine, alone of all the aconite alkaloids is saponified into aconine, benzoic acid and acetic acid by alkalies, an attempt was made to saponify all the samples under examination by means of alcoholic potash, and then collect the benzoic acid upon a weighed filter. For each molecule of benzoic acid formed one molecule of aconitine is to be regarded as present, the calculation being—

						[aconitine.
Molecular w't benzoic acid	:	molec. w't aconitine	=	w't acid found	:	w't present pure
122	:	645	=	in grammes	:	in grammes.

Knowing the amount of aconitine originally taken for assay, the percentage of pure aconitine can be determined. Thus in case of our products;

I. Aconitine taken—0.519 grm. and benzoic acid found—0.060 grm. equiv. to 61.1 per cent. pure aconitine.

II. Aconitine taken—0.791 grm. and benzoic acid found—0.095 grm. equiv. to 63.5 per cent. pure aconitine.

III. Aconitine taken—0.4365 grm. and benzoic acid found—0.063 grm. equiv. to 76 per cent. pure aconitine.

IV. Aconitine taken—0.398 grm. and benzoic acid found—0.058 grm. equiv. to 77 per cent pure aconitine.

V. Aconitine taken—0.4135 grm. and benzoic acid found—0.068 grm. equiv. to 87 per cent. pure aconitine.

VI. Aconitine taken—0.5680 grm. and benzoic acid found—0.083 grm. equiv. to 77.2 per cent pure aconitine.

It has been averred by a recent investigator of aconitine that the benzoic acid obtained as a result of the saponification of the aconitine is derived from an intermediate product, benz-aconine, between aconitine and aconine, and that the acetic acid is derived from the crystallized aconitine,

thus making the determination of the acetic acid a means of assaying the drug. Let me ask him—may not other alkaloids of aconite root besides either aconitine or benz-aconine be present that might yield acetic acid and thus be counted as aconitine? At any rate a standardized solution of alcoholic potash was freshly made and used for the saponification experiments, it being supposed that this would neutralize and hence determine both acids combined, and then by subtracting the weight of benzoic acid actually weighed, as given above, the amount of acetic acid would be determined. This is correct in theory, but does not work in practice, which may be due to certain additional alkaloids present as impurities or to a more deep-seated change in the molecule due to the action of the potassium hydroxide. The results:

I. Aconitine taken 0.519 grm.; added 15 C.c. alcoholic potash (10 C.c. of which represent 20.4 C.c. decinormal sulphuric acid); diluted with alcohol. There were required 22.41 C.c. decinormal sulphuric acid to neutralize the excess of alkali. These 22.41 C.c. = 11.98 C.c. potash solution. Hence 15—11.98 = 4.02 C.c. potash solution were used to saponify the aconitine taken. These 4.02 C.c. potash solution represent 0.04796 grammes KOH. The benzoic acid formed during the saponification was filtered off and weighed, and found to weigh 0.060 grammes, and required for saponification 0.0273 grammes KOH. Hence for saponification of the acetic acid are required 0.04796—0.0273 grammes = 0.02066 grammes KOH, equivalent to—

$$\frac{645\ (\text{molec. wt. aconitine}) \times 0.02066}{56\ (\text{molec. wt. KOH})} = 0.238\ \text{grammes pure aconitine;}$$

whence 0.519 grm. : 0.238 grm. = 100 : x and $x = 40.3$ per cent. pure aconitine.

II. Took 0.791 grammes aconitine, and by similar process to above found 76.3 per cent. pure aconitine.

III. Took 0.4365 grammes aconitine, and by similar process to above found 139.8 per cent. pure aconitine.

IV. Took 0.398 grammes aconitine, and by similar process to above found 41.3 per cent. pure aconitine.

V. Took 0.4135 grammes aconitine, and by similar process to above found 144.6 per cent. pure aconitine.

VI. Took 0.5680 grammes aconitine, and by similar process to above found 143.8 per cent. pure aconitine.

These results, deduced from the amount of acetic acid neutralized by the standardized alcoholic potash solution, just given, show conclusively that this is not a reliable method of assay, for every sample examined was tested and found not to react acid to litmus, thus precluding the possibility of there being any free acid present to neutralize any of the potash and increase the percentage of acetic acid, *i. e.* of aconitine present. The

benzoic acid method also is unreliable, as it is not probable that sample IV, which melts at 83°—97° C. (while pure aconitine crystals melt at 197°–198° C.) should contain as much as 77 per cent. of pure aconitine, and besides benzoic acid being volatile, some of it may escape by sublimation while being dried. From the results obtained the following conclusions may be drawn:

I. That none of the aconitines of the market examined are pure aconitine of melting point 197°–198° C. (Freund).

II. That no two of them are the same.

III. That no two can be regarded as sufficiently alike to enable a physician prescribing them to expect the same results from the same prescription compounded at different pharmacies, or at any rate of aconitines of different makes.

IV. That in no case can the physician expect to get the therapeutic effects of pure aconitine.

V. That sample 1 probably contains pseudaconitine principally.

That sample 2 probably contains apoaconitine principally.

That sample 3 probably contains apoaconitine and some aconitine.

That sample 4 probably contains either a different substance from any above enumerated as existing in aconite root, or a decided mixture of substances that would much depress the melting point of any aconitine were it present.

That sample 5 probably contains fairly pure apoaconitine.

That sample 6 is purer probably than the others, but is nevertheless impure to a slight degree, as it is cream-colored, and should be white, and although it melts close to the melting point of pure aconitine, still yields the same results on titration as the others do.

VI. That until we know more about the remaining alkaloids and constituents of aconite root, no reliable method of assay of the root or the active principle aconitine can be devised, and that neither of the methods above tried are to be considered as reliable.

VII. That if aconitine is to be considered an official chemical by the U. S. P., some effort should be made to so establish its identity that a physician may get the effects of aconitine when he prescribes the same, and always get the same effects whenever he prescribes it.

Baltimore, July 11, 1895.

MR. CASPARI: I think we have with us Professor Prescott, who may be able to give us some ideas on this subject.

MR. PRESCOTT: I have not worked with aconitine, Mr. Chairman. This work seems but to reaffirm the view already prevailing, and aconitine has been virtually dropped from the Pharmacopœia. If we can have it in any pharmacopœial form it must be with some preservative, and probably with some concentrated preservative rather than the absolutely pure alkaloid itself. It is too often forgotten, however, that this remarkable instance of an unstable alkaloid, unstable from saponifaction both by alkalies and acids, is

not the only instance of a saponifiable alkaloid, but we have a good many of them that have become saponified upon further treatment with reagents.

This brings us more clearly to apprehend the liability of alkaloids to split off acids of which they are really ethereal salts, or split off other alkaloids of which they are true ethers. This should be remembered and kept watch of more fully in all manufacturing works in which alkaloids are involved. At present I do not know but that Dr. Squibb's physiological test is the most reliable we have.

MR. MAYO: I believe there has been a rule established here that precedence be given to those papers the authors of which are present to read them. I would like to make a motion, that that rule be followed in this instance.

Seconded and carried.

THE CHAIRMAN: There are no papers here just now whose authors are present. Some of them are in the building, but not in the room. The next paper in order is the paper by Professor Bastin on the examination of wild cherry barks, which will be read by Professor Whelpley.

THE STRUCTURE OF OUR CHERRY BARKS.

BY EDSON S. BASTIN.

The knowledge that the barks of two or more of our native species of cherry were occasionally, at least, substituted for the official species, has led to the studies set forth in this paper.

The species of cherry growing wild within the limits of the United States are the following: *Prunus Pennsylvanica* Linné filius, *Prunus virginiana* Linné, *Prunus serotina* Ehrhart, *Prunus demissa* Walpers, *Prunus avium* Linné, *Prunus Cerasus* Linné, *Prunus Mahaleb* Linné, *Prunus Caroliniana* Aiton, *Prunus sphacrocarpa* Swartz, *Prunus emarginata* Walpers, *Prunus emarginata* Walpers, var. *mollis* Brewer, and *Prunus ilicifolia* Walpers.

This list excludes the closely related plums and those species of cherry which do not attain dimensions greater than those of a small shrub.

Of the species listed, the barks of the following have been studied and are here described and figured: *P. serotina*, *P. avium*, *P. Mahaleb*, *P. Virginiana*, and *P. Pennsylvanica*. Efforts were made to procure the barks of *P. Caroliniana* and of the Pacific coast species, *P. demissa*, *P. emarginata* and *P. ilicifolia*, but so far without success.

Prunus serotina, commonly called the Black cherry, is a tree of large size, common in the forest regions of the United States from Minnesota, eastern Nebraska, and Louisiana eastward to the Atlantic. It also occurs in Southern Canada and Nova Scotia. It does not occur in the Rocky Mountains or west of them, except as cultivated in San Francisco and vicinity, and perhaps in the vicinity of some other cities of the Pacific coast. It seems to attain its fullest development in the valley of the Ohio, where it sometimes attains the height of a hundred feet, and its trunk a diameter of four feet. Ordinarily, however, it is smaller, with a trunk eighteen inches in diameter, and a height of fifty or sixty feet. Its close-grained heartwood, which is capable of taking a high polish, and which has a light

red color deepening with age, is highly valued for cabinet and ornamental work. The bark of the trunk is blackish-brown and rough exteriorly, the exterior corky layers exfoliating transversely in thickish but rather narrow pieces. The bark of the twigs, however, is smooth or even glossy, dark reddish brown, thickly punctate with small whitish and transversely elongated lenticels, and the corky layer may be readily peeled off transversely in a thin papery layer, exposing the deep green middle bark beneath. The corky layer of the root, which is somewhat lighter colored, begins to fissure and exfoliate much earlier; and when the cork is removed it exposes a middle layer which is at first white, but, on exposure, soon turns ochreous brown. The leaves are short-petiolate with thin, lanceolate, toothed, deciduous stipules, and elliptical, oblong, or oblong lanceolate, taper-pointed, appressed-serrulate leaves which are usually obtuse, but sometimes acute at the base, and commonly have a pair of glands on the petiole near the insertion of the blade. They are smooth on both surfaces, and deep and somewhat glossy green on the upper and much lighter green on the lower.

The flowers occur in late spring, after the leaves, in simple racemes at the ends of small leafy branches. They are small, white, and with a decided, but not very agreeable odor. The drupes are small, round, about the size of peas, blackish-purple, destitute of bloom, bitterish but not decidedly astringent to the taste, and containing a roundish-ovate, marginless pit.

Structurally the barks of the different species of cherries examined resemble each other in the following particulars:

1. The phellogen begins its formation in the first layer of collenchyma cells beneath the epidermis, and no considerable development of the phelloderm layer beneath takes its place.

2. They all resemble each other in the facility with which the periderm layers are separated transversely into thin sheets.

3. The medullary rays in all the species are several rows of cells thick, though the number of cells differs somewhat in different species.

4. In all the barks examined the medullary rays of the bark are more or less wavy in their course, though less so in some species than in others.

5. All the barks show a strong tendency to fissure between the medullary rays and adjacent bast tissues.

6. All of the barks, especially of the trunk and older branches, are rich in oxalate of calcium crystals, some of them containing it in such quantities as to make sectioning difficult.

7. All of the barks possess a bitter, astringent and more or less aromatic taste, but the bitterness is much less marked in some than in others, and the aromatic quality is very decided in some, but barely perceptible in others.

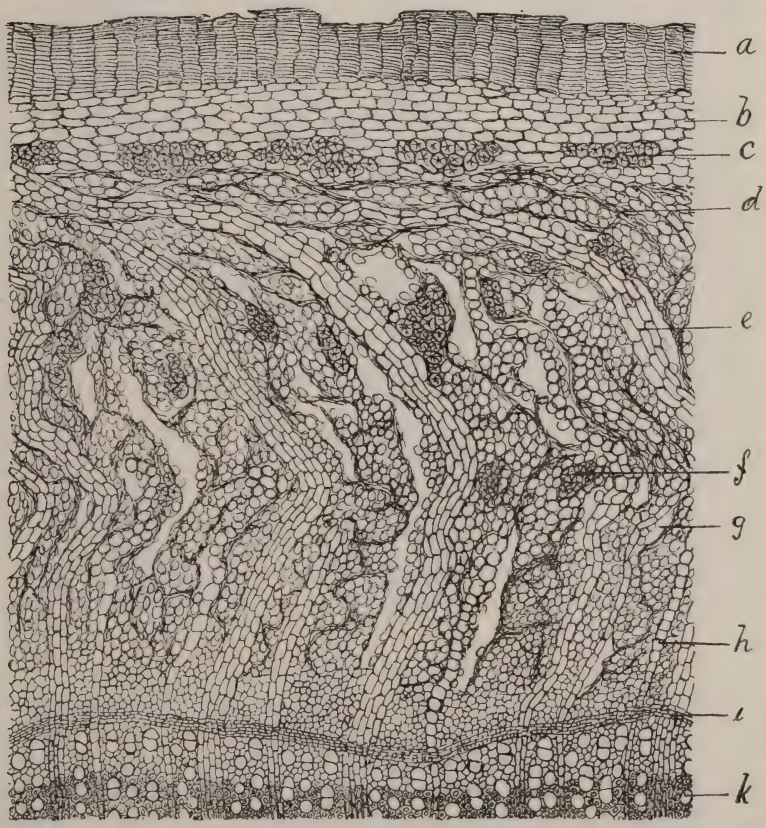
The most prominent structural differences are in the number, arrangement and character of the sclerenchymatous elements. These and other

differences will be noticed in the descriptions of the barks of the different species.

BARK OF THE STEM OF PRUNUS SEROTINA.

The periderm or corky layer separates readily in transverse bands from the rather thin green layer or cortex beneath. The latter contains numerous clusters of short sclerenchymatous cells or stone cells, which form an interrupted zone in this layer of bark. Just underneath this layer the medullary rays, whose course from the cambium zone outward is more or less wavy, terminate very obliquely. The rays in their thickest part are from four to six cells broad, and between them lie the bast masses which, except near the cambium zone, consist of crumpled sieve elements sprinkled with

FIG. 1.

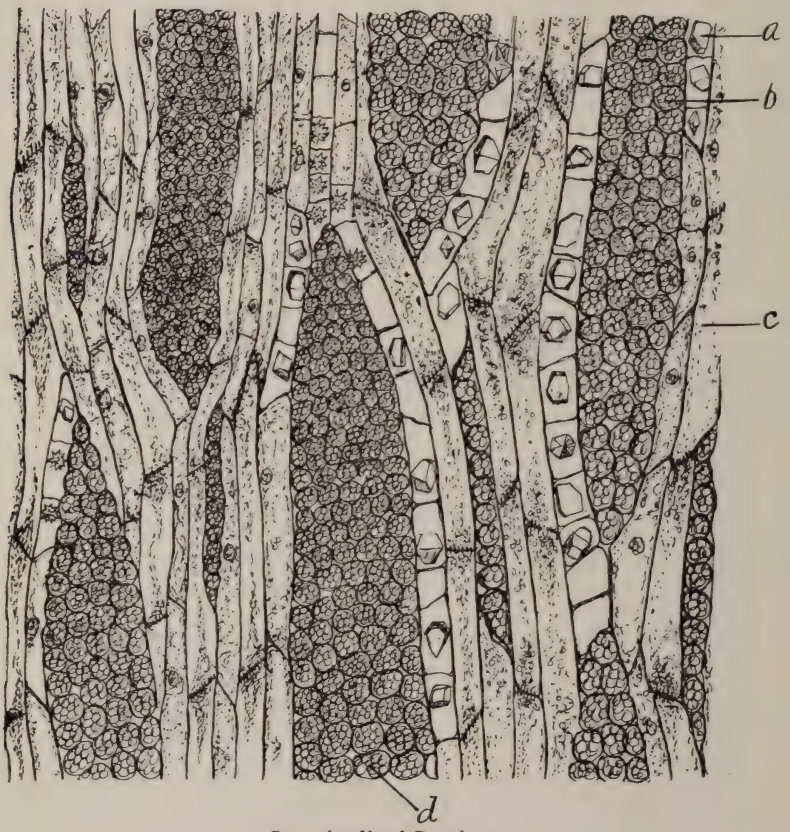


Transverse Section of Bark of Prunus Serotina.

Transverse section of bark of *Prunus serotina* magnified seventy-five diameters. The specimen was from a stem only five or six years old, *a*, cork, probably secondary periderm; *b*, middle or green layer of bark; *c*, clusters of stone cells in inner portion of middle bark; *d*, compressed sieve-tissue in the outer portion of bast layer; *e*, a medullary ray; *f*, mass of stone cells; *g*, fissure between medullary ray and bast; *h*, medullary ray; *i*, cambium zone; *k*, duct in mature wood.

masses of sclerenchyma. These masses are made up chiefly of stone cells, but sometimes contain more elongated elements which perhaps might be regarded as bast fibers. They are, however, much shorter than bast fibers usually are, and every gradation between them and stone cells may be observed. The fissuring along the bast masses is conspicuous in the cross section. In the older bark, crystals of calcium oxalate are so abundant as

FIG. 2.



Longitudinal Section.

Small portion of longitudinal section made well toward the cambium zone and parallel to it. Magnification about seventy-five diameters. *a*, crystal of calcium oxalate; *b*, a medullary ray-cell containing starch; *c*, sieve-tube; *d*, medullary cell.

to seriously interfere with sectioning. These crystals are sometimes stellately clustered, but more commonly are single, and are most abundant in the cells adjacent to the medullary rays.

The medullary rays contain usually an abundance of very fine-grained starch. The granules of starch are usually spheroidal and simple, with an inconspicuous central or sub-central hilum, and no other recognizable markings. Some double and treble grains, however, are observable.

The root-bark of this species bears a close resemblance to that of the stem, but it is lighter exteriorly and the corky layer earlier begins to fissure. The clusters of sclerenchyma cells are less numerous and the bast fibers somewhat better differentiated. They are still few in number, however, as compared with the stone cells, and they occur chiefly in associa-

FIG. 3.

Sclerenchymatous Elements.

Some of the sclerenchymatous elements from the same species, magnified 230 times, the longer of these cells perhaps to be regarded as bast fibers, or as transition forms between stone cells and bast fibers.

FIG. 4.

Prunus Serotina.

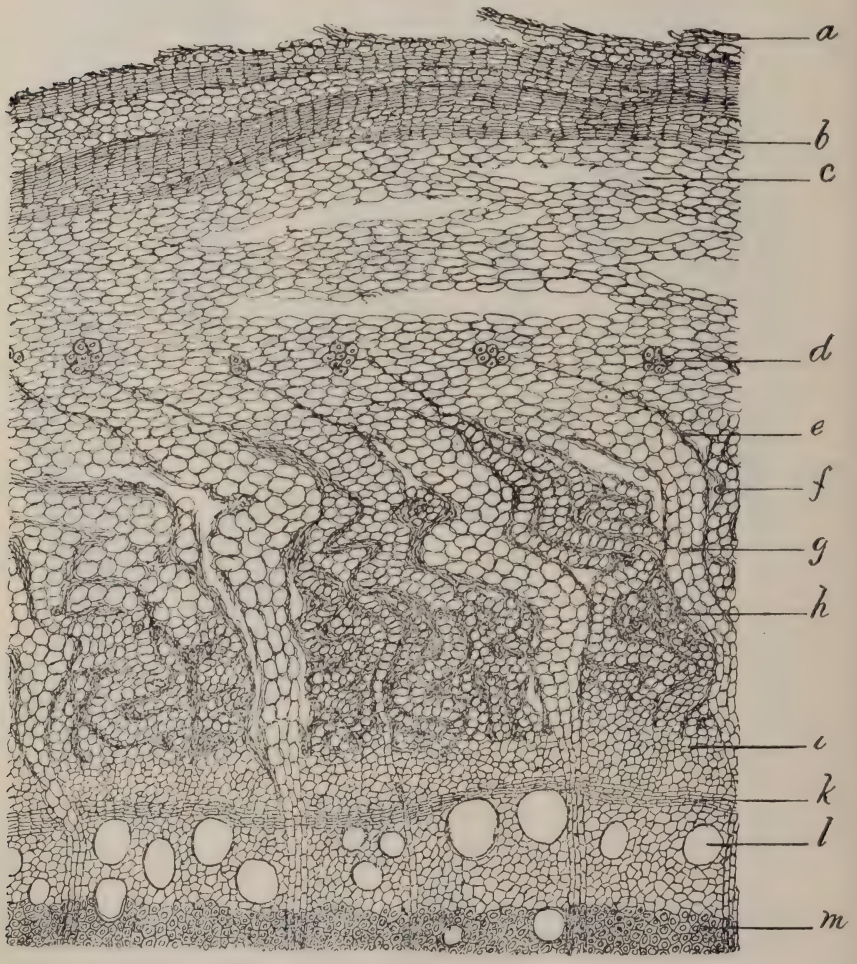
Starch grains from bark of *Prunus serotina* magnified 1200 diameters.

tion with the latter, though sometimes they are isolated or in separate clusters of few fibers.

Both root and stem-bark are decidedly bitter and aromatic and somewhat astringent to the taste. The aromatic or bitter almond odor and taste in fresh specimens are more pronounced in the root-bark. This would lead to the inference that the latter is the more valuable of the two for medicinal purposes.

THE STEMBARK OF PRUNUS MAHALEB.

FIG. 5.



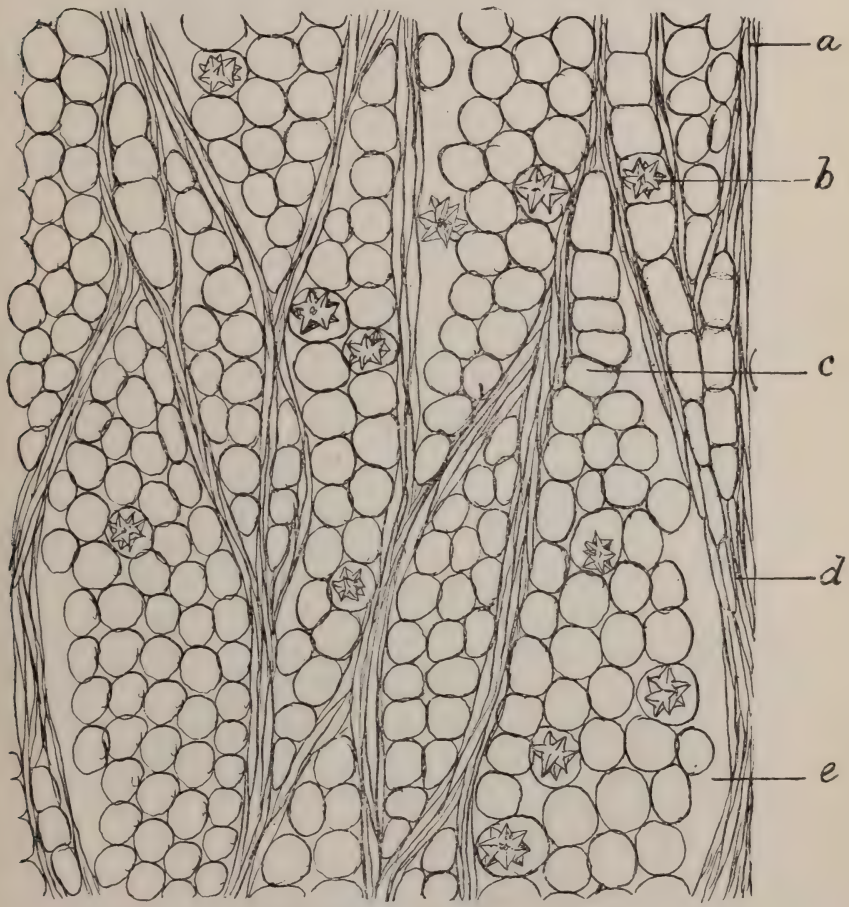
Cross Section of Bark of Prunus Mahaleb.

Cross section of bark of Prunus Mahaleb magnified about 75 diameters. *a*, cork exfoliating from exterior surfaee; *b*, secondary cork formation farther interior; *c*, fissure in cortex; *d*, primary bast fibers in outer portion of bast layer; *e*, compressed sieve tissue; *f*, single bast fiber. (A few scattered bast fibers occur in the secondary bast in this species. *g*, medullary ray; *h*, compressed sieve tissue; *i*, newly formed bast; *k*, cambium zone; *l*, large duct in newly formed wood; *m*, wood of previous season.

The bark on the old stem is dark-gray and fissured, though less strongly so than that on the trunk of *Prunus serotina*. There appears to be a greater development of secondary cortex in this species than in *Prunus serotina*, and a corresponding difference in the cork formation. Some of the later-formed bands of secondary cork not merely invade the inner cortex, but in the older bark cut even into the outer portion of the bast layer.

The sclerenchymatous elements are less abundant than in Prunus serotina, and consist mostly of small clusters of bast fibers, stone cells being wholly or nearly absent. The medullary rays are quite similar to those of *P. serotina*, and the intervening sieve elements are, in the older bast areas,

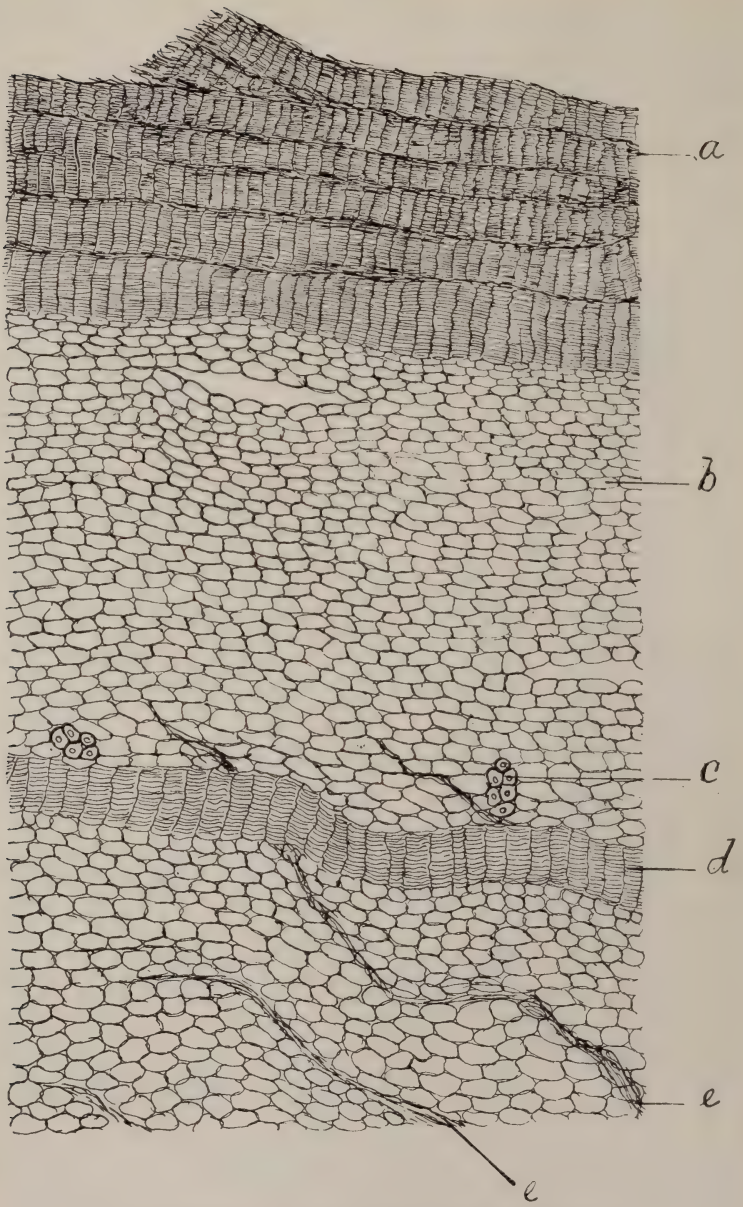
FIG. 6.



Tangential Section of Prunus Mahaleb.

Tangential section through bast layer of Prunus Mahaleb, showing medullary rays and compressed sieve tissue. Magnification about 230 diameters. *a*, compressed sieve tissue; *b*, crystal cell; *c*, ordinary parenchyma cell of medullary ray; *d*, compressed sieve tissue; *e*, fissure between medullary ray and sieve tissue.

FIG. 7.



Cross Section of Outer Bark of Prunus Mahaleb.

Cross section of outer part of bark of Prunus Mahaleb, showing mode of cork formation. *a*, outer layers of cork exfoliating at the surface and showing stratification lines. The cork readily splits along these lines; *b*, cortex or middle bark; *c*, cluster of primary bast fibers; *d*, secondary cork forming interior to the clusters of primary bast fibers; *e*, compressed sieve tissues. Magnification about 75 diameters.

likewise much crushed and fissured. Crystals of calcium oxalate are abundant, but much less so than in *P. serotina*, and are seldom single in the cells, but in stellate clusters. Probably owing to the season of the year when the bark was gathered, namely in June, no starch grains were recognized.

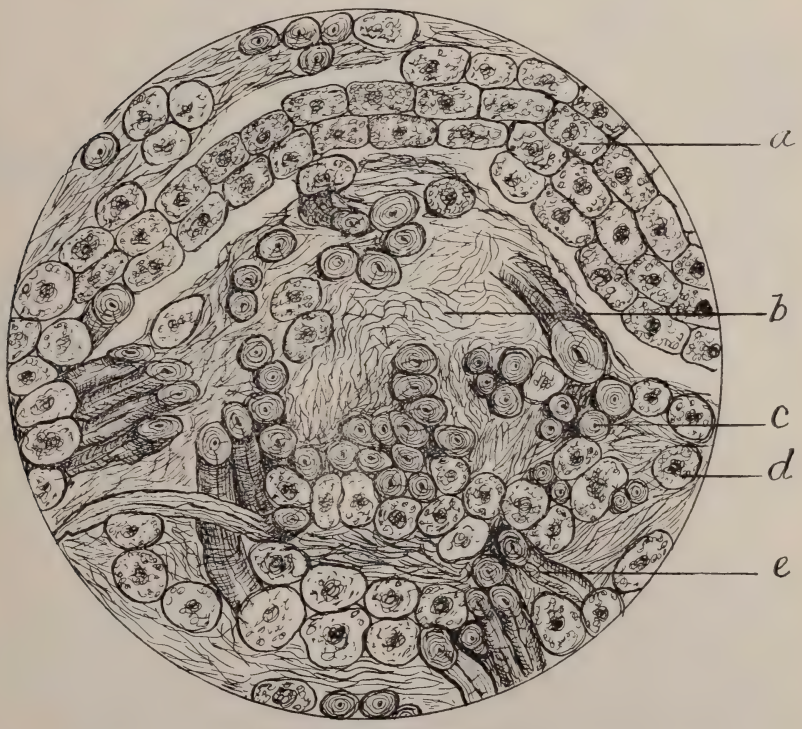
The bark has the bitterness and astringency of the official species, but much less of the aromatic quality.

Often the portions of the wood adhering to a medicinal bark afford characters which aid in identification. Between the wood of Prunus Mahaleb and that of the official species there are marked structural differences. The ducts of the former are much larger and also less evenly distributed, being most abundant and largest adjacent to and on the exterior side of the ring of growth, so that the rings of growth are rendered much more conspicuous to the eye.

THE STEM BARK OF PRUNUS AVIUM.

The bark of this species is smoother and lighter colored, being reddish-

FIG. 8.



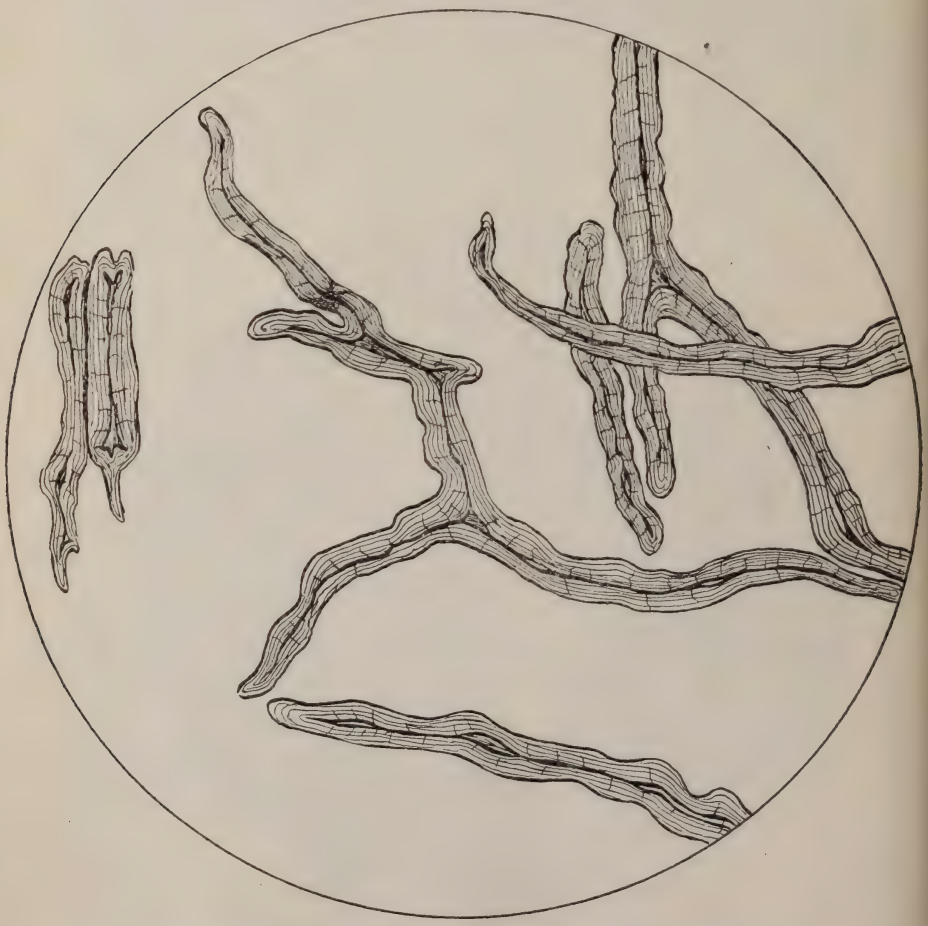
Inner Layer of Stem Bark.

Small portion of cross-section of inner layer of stem bark of *Prunus avium* magnified about 230 diameters, showing arrangements of bast fibers. *a*, portion of medullary ray well toward the outside of the bast layer; *b*, compressed sieve tissues; *c*, bast fiber: *d*, parenchyma cell; *e*, bast fiber in oblique view.

brown on the twigs of the second or third year and deep gray or reddish-gray on the trunk. The lenticels on the twigs are much fewer than in the official species, but they are still present and enormously increased in size in trunks, six inches or more in diameter. They appear as lenticular, transversely-elongated, corky patches, often two inches or more in length. The outer bark may be easily stripped off transversely in broad bands, exposing the deep green middle bark, and the corky layer, in turn, may be easily split into thin lamellæ, corresponding to the concentric stratification lines seen in the cross-section.

The inner bark shows the wavy medullary rays, terminating very ob-

FIG. 9.



Sclerenchyma Fibers.

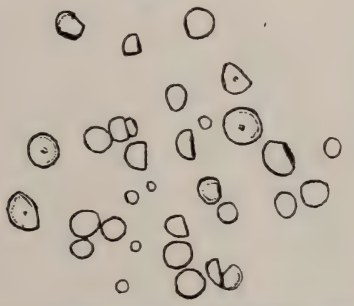
Some of the sclerenchyma fibers as they appeared in situ in a longitudinal tangential section of the bark of *Prunus avium*. Magnification about 230 diameters. The more regular, slender and elongated fibers usually occur in masses.

liquely at the exterior, the wavy bands of compressed sieve tissue in the older portions, and the fissuring between the medullary rays and the bast masses which are shown in most species of cherry, but it differs from the official species and from some others in the decidedly fibrous character of the bast layer. There are not only scattered and very tortuous lignified fibers in its outer portions, or even extending into the middle bark, but clusters and isolated fibers occur abundantly throughout the bast. Many of the fibers, especially those occurring in bundles, are long and slender, and run quite regularly lengthwise of the bark; but others, especially the isolated ones, are very irregular in form, tortuous in their course, and often branching.

The masses of bast fibers are never very large, and are not arranged with any apparent order.

Crystals of calcium oxalate in the specimens examined were much less abundant than in P. serotina, and they were nearly always in stellate masses.

FIG. 10.



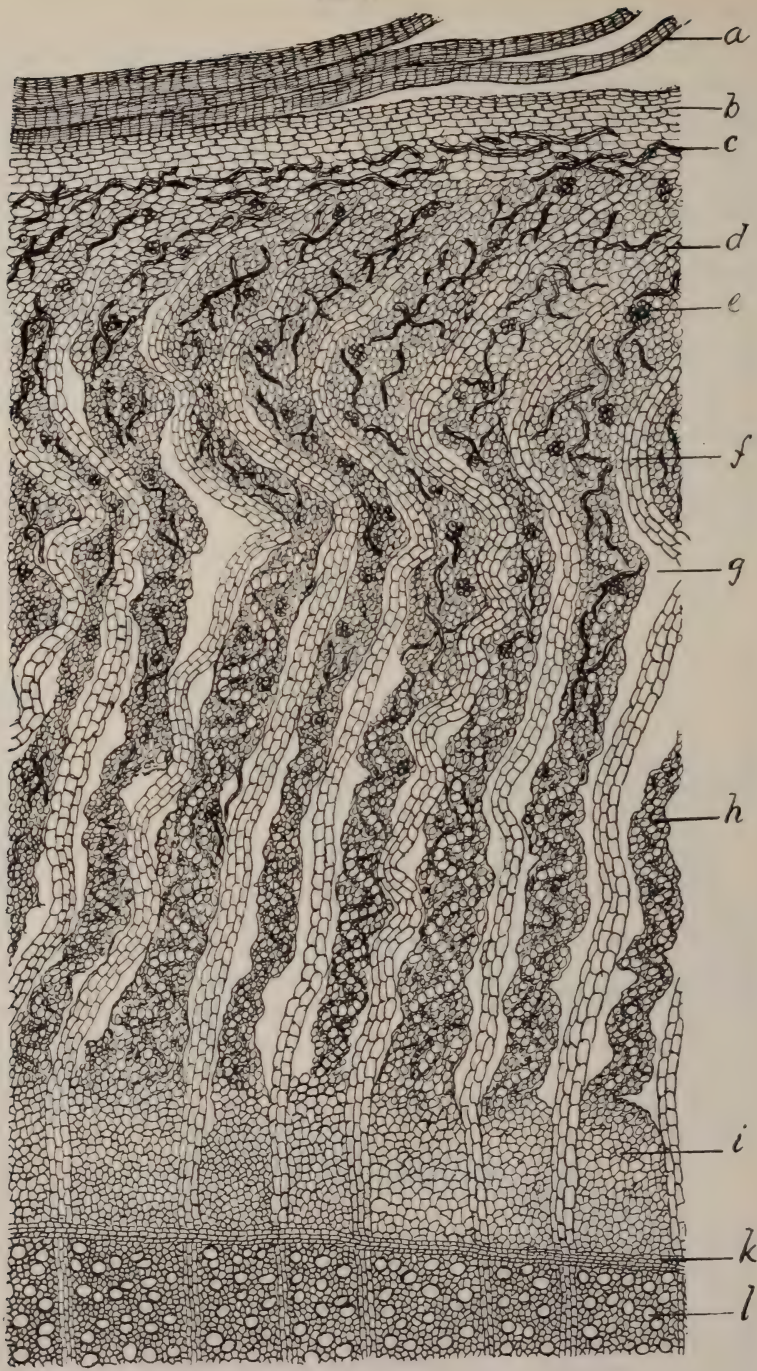
Starch Grains of Prunus avium Magnified 1200 Diameters.

The specimens studied were gathered in June and July, and in these starch, though present in the medullary ray-cells, was not abundant. It was also very fine-grained; the grains were often rounded and simple, but also frequently double or triple. The faintly distinguishable hilum is nearly central. The taste of this bark is decidedly bitter and astringent, but the aromatic or bitter-almond odor and taste are usually scarcely perceptible.

THE STEM BARK OF PRUNUS PENNSYLVANICA.

This tree when not in fruit or flower might be mistaken for a small specimen of *P. serotina*, for the habit is similar and the bark of the trunk, though usually lighter colored and smoother than that of the official species, is occasionally in the older specimens quite dark, and rough enough to resemble that of young and thrifty specimens of *P. serotina* of similar size. The lenticels on the twigs, however, perceptible also even on the older trunks, are much less numerous. Of course there would be no difficulty in distinguishing this species when in flower, for its flowers occur in

FIG. 11.



Stem Bark of Prunus Pennsylvanica.

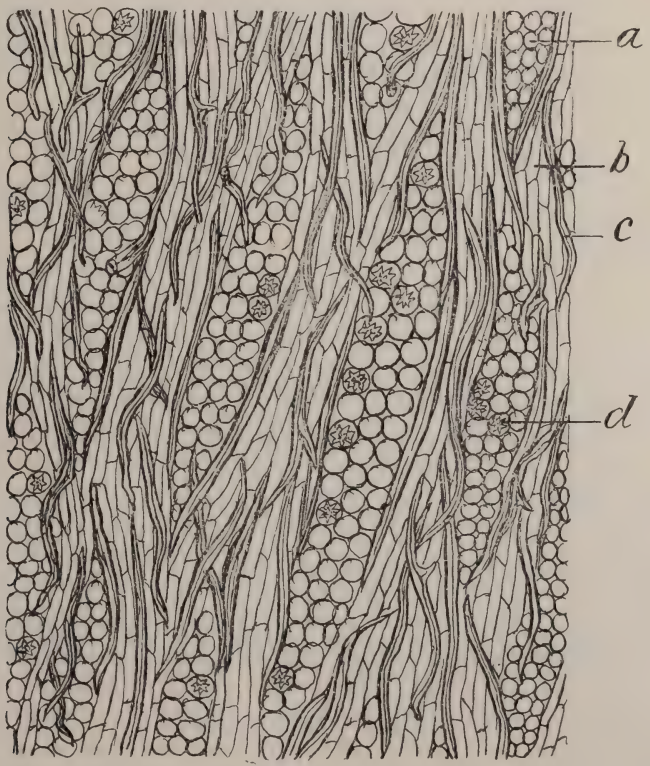
Cross section of the stem bark of *Prunus Pennsylvanica* magnified about 75 diameters. *a*, cork in layers, represented as separating from the middle bark; *b*, *c*, irregular or tortuous sclerenchyma fibers; *d*, medullary ray; *g*, fissure between medullary ray and bast; *h*, compressed sieve tissue; *i*, young bast tissues near cambium; *k*, cambium zone; *l*, a duct in the wood.

umbel-like clusters instead of racemes, in early instead of late spring, and from separate, lateral, scaly buds instead of on the ends of lateral leafy branches. The fruits also are red, on long pedicels, and with a thinner, more acid and not a bitter taste.

The lenticels on the trunk are not so large as those of *P. avium*, seldom attaining a length transversely of more than half an inch. The corky layer, however, separates from the sublying green tissue in a very similar manner, and in cross section this layer shows a similar though finer stratification. When the brown or blackish scurf is rubbed from the surface of the periderm a fine red-brown or mahogany color is exposed.

In this species, as in *P. avium*, there appears to be but a slight development of the secondary cortex. Similarly, the medullary rays of the inner bark are oblique and wavy. They are, however, narrower, being seldom more than three cells broad. The fissuring and the collapsed sieve tissue are also similar. The older portions of the inner bark abound in tortuous

FIG. 12.



Inner Bark of P. Pennsylvanica.

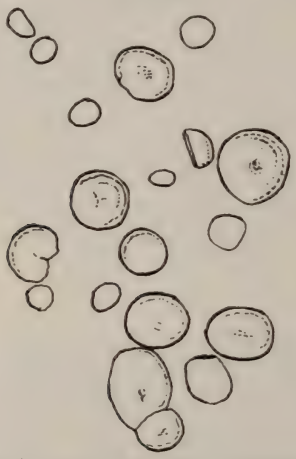
Portion of longitudinal tangential section of inner bark of *P. Pennsylvanica*, magnified about 75 diameters. *a*, medullary ray; *b*, soft bast cell; *c*, bast fiber; *d*, crystal cell.

and strongly lignified sclerenchyma fibers, similar to those of *P. avium*, but the clusters of more typical bast fibers are considerably less numerous.

The taste of this bark resembles that of *P avium*, being decidedly bitter, somewhat astringent, but scarcely at all aromatic.

Crystals of calcium oxalate abound, and they are mostly in stellate masses.

FIG. 13.



Starch from bark of *Prunus Pennsylvanica*, magnified 1200 diameters.

The starch grains are similar in shape to those of *P. avium*, but they average of larger size, and compound forms appear to be somewhat less numerous.

STEM BARK OF PRUNUS VIRGINIANA.

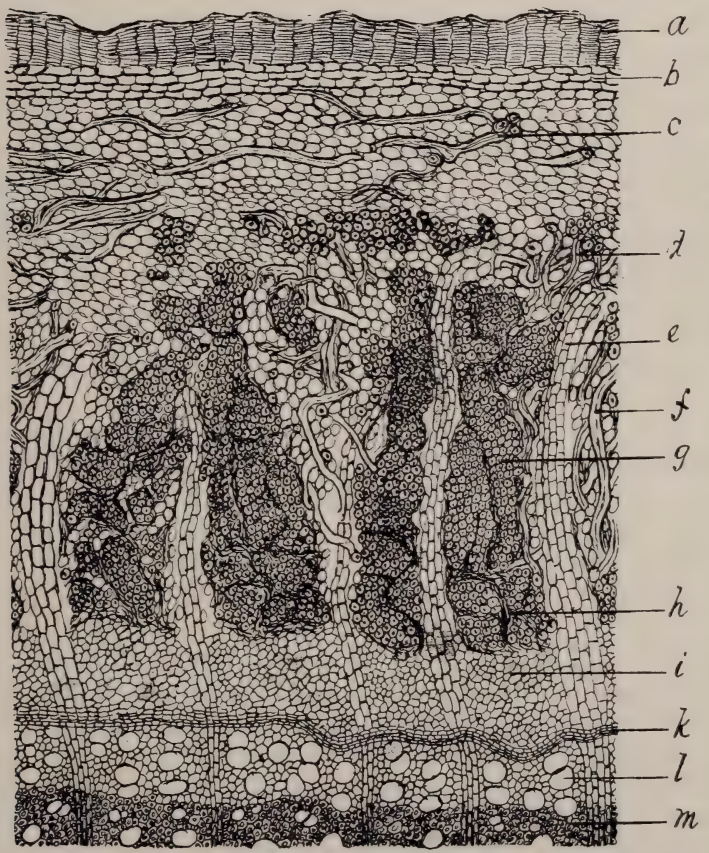
This tree, commonly called Choke Cherry, on account of its very astringent fruit, is undoubtedly often confounded with the Black Cherry. This is not only because it is often in general appearance similar to that of a small Black Cherry tree, but because its flowers and fruits are similar in size, color and arrangement, being borne in both cases in racemes. Our pharmaceutical nomenclature also adds to the danger of confusion, the name *Prunus Virginiana* being still absurdly retained as the pharmacal name of the drug obtained from *P. serotina*.

There is no real reason, however, why any one tolerably familiar with the botanical characters of the two species should confound them, for there are marked differences. *P. Virginiana* is, in the first place, a much smaller tree, in fact, usually more a shrub than a tree, though sometimes its stem attains a diameter of two or three inches. Its branches and trunk are not so dark, being rather grayish than blackish, and the lenticles are much less numerous. Its leaves are thin, oval-oblong or ovate, abruptly pointed, and sharply serrate with slender projecting teeth; while those of the Black Cherry are thickish, oblong-lanceolate or oblong and taper-

pointed, but less abruptly so than in the other species, and the margins are serrate with incurved, short and callous teeth. The serrations on the leaves of Choke Cherry are also often double, which is not the fact with those of the Black Cherry. The petals of the Choke Cherry are more rounded than those of the Black Cherry.

The microscope, however, reveals the most decided difference in the structure of the barks. The medullary rays in *P. Virginiana*, which are three or four cells wide, are less flexuous than in *P. serotina* or in any other species examined. Proper stone-cells, so abundant in the bark of

FIG. 14.



Stem Bark of P. Virginiana.

Cross section of stem bark of *P. Virginiana*, magnified about 75 diameters. *a*, periderm; *b*, outer cortex (collenchyma); *c*, *d*, tortuous sclerenchyma fibers; *e*, medullary ray; *f*, sclerenchyma fiber; *g*, large mass of secondary bast fibers; *h*, compressed sieve tissues separating masses of bast fibers; *i*, younger bast; *k*, cambium zone; *l*, duct in newly formed wood; *m*, mature wood.

the Black Cherry, are almost wholly absent from the bark of the Choke Cherry, but the tortuous sclerenchyma fibers similar to those in *P. avium* and *P. Pennsylvanica* not only abound in the inner bark, but in the cortex. Bast fibers of the ordinary form also occur in large and irregular masses in all the mature portions of the inner bark. By reason, perhaps, of the abundance of bast fibers, the radial fissuring, so observable in all the other species studied, is much less conspicuous in this.

Owing probably to the fact that the specimens studied were gathered in the season of active growth, namely about the first of June, no starch was found in the sections examined.

Oxalate of calcium crystals in stellate masses are abundant in the species.

In aromatic quality and in bitterness, this species is inferior to the Black Cherry, though the bitter-almond odor and taste are much more evident than in any of the other species thus far studied.

Another cherry bark, samples of which were sent by Professor Henry G. Greenish, of London, has been examined by the writer, and found to resemble in most of its structural characteristics that of our *P. Pennsylvanica*. It differs from the bark of this species markedly, however, in some particulars, and was probably derived from one of the unstudied Pacific coast species. The sample was very bitter, somewhat astringent, and slightly aromatic. Professor Greenish states that the sample was taken from a quantity which had been sent to the London market as wild cherry bark.

This outline of the studies thus far made by the writer in this genus must be considered merely as preliminary to a more complete account which he expects to publish at a future time. In the meantime it is hoped that the descriptions and illustrations here given may be of service to our profession, and aid in emphasizing the importance of the study of the histological structure of drugs. The writer's thanks are due to Mr. Henry L. Clarke, of the University of Chicago, for securing for him authentic specimens of the bark of Prunus Virginiana.

DR. WHELPLEY: This paper is based upon the supposition that the Pharmacopœia has made official all those species of wild cherry bark which are of the most therapeutic value, but that the other species should not be substituted for them. I think there is an opportunity here for a paper on the subject of the relative value of the various species of wild cherry bark, and I would certainly like to see such a paper follow this one at the next annual meeting.

ASSAY OF WILD CHERRY BARK.

BY A. B. STEVENS, PH. C., AND J. N. JUDY, PH C.

QUERY NO. 1—"Is the thin, green wild cherry bark really more valuable therapeutically than the older and thicker bark? Make comparative assays.

The therapeutic value of the bark depends upon the amount of the active principles within the bark. This principle is a glucoside, identical

with or closely allied to amygdalin. Therefore the query can be answered only by a comparison of the results obtained by the assays requested.

The thick bark occurs in the market in slightly curved or arched pieces of various sizes, the length being about 25 to 80 Mm., and the breadth 13.5 to 50 Mm. The thickness of the pieces which consist entirely (or nearly so) of the inner bark is about 3.15 to 4.16 Mm. In cases where the outer portion of the bark is attached it is nearly or quite 6 Mm. thick.

The thin bark has the principal characteristics of the thick bark, such as odor, fracture and color, which may vary somewhat, also differing in thickness, being about 2 to 2.8 Mm. thick. It is also found in the market in somewhat smaller fragments than the thick bark.

Both the thick and thin barks vary in color and other external characteristics according to the size of the pieces, and the presence or absence of the periderm, etc. When the periderm is attached, the pieces are of rougher character, and in such parts of the bark the color is redder, and somewhat spotted at intervals with irregular grayish silver-white or brownish patches. Some of the smaller pieces, particularly the thin bark, present a uniform reddish-yellow appearance and are nearly smooth externally. Internally the bark has a deep yellowish or reddish-brown color, the color of the thick bark being the more intense. On the inner surface of the bark occasional portions of wood are found. The longitudinal fracture is close and presents a rough surface of a yellowish-gray color interspersed with reddish spots and stripes. The transverse fracture is close, somewhat rough and fibrous, and of a redder hue than the longitudinal. The texture of the bark is somewhat spongy, particularly the inner layers.

Carefully selected samples of each variety were obtained and the wood and outside rough portions removed, after which the bark was ground into fine powder and each sample placed in a glass-stoppered bottle.

The method of estimation was based upon the conversion of the glucoside into hydrocyanic acid and a volatile oil; second, upon the distillation of the hydrocyanic acid to separate it from the bark; and third, upon the estimation of the hydrocyanic acid. Two methods were used. The details of the operations are as follows:

First method.—Ten grammes of the drug were placed in a small flask, about 100 Cc. of water were added, corked tightly, macerated for twelve hours, and connected with a large condenser. A moderate heat was then applied and the distillate conducted into a solution of potassium hydroxide, the distillation being continued almost to dryness. About 150 Cc. more of distilled water were added through a glass-stoppered thistle tube, and distillation continued as before. This operation was repeated not less than four times to secure the absolute removal of all the hydrocyanic acid from the drug, after which the condenser was thoroughly rinsed to remove any adhering hydrocyanic acid. The amount of acid was then estimated volumetrically, by titrating the slightly alkaline solution of potassium cyanide with decinormal silver nitrate solution.

The second method of estimation was as follows: The drug was macerated and distillation continued as in the first method, but this time the distillate was conducted into a solution of silver nitrate. An insoluble silver cyanide was formed. The precipitate was allowed to settle, the supernatant liquid decanted through small counterpoised filters, the precipitate transferred to the filter, washed, dried and weighed.

The glucoside was estimated without decomposition, as follows:

Five grammes of the drug were placed in a Soxhlet's apparatus, extracted with absolute alcohol for six hours, and the alcoholic extract evaporated to a syrupy consistence. An excess of ether was added, precipitating all the glucoside, together with some coloring matter and resin. The precipitate was washed with ether, on the filter, and treated for a short time with 100 Cc. of boiling distilled water. The solution was allowed to cool. The glucoside in solution was filtered, the filter washed with a little hot water, and the washings and filtrate mixed. The solution was evaporated to dryness in a weighed porcelain dish, and again weighed; the increase in weight represented the glucoside.

In order to test the accuracy of the above method, and to ascertain the number of distillations necessary to obtain all of the acid, the distillates were collected separately, and the acid in each estimated with the following results:

First distillate		17.15	per cent.	hydrocyanic	acid.
Second	"	11.2	"	"	"
Third	"	5.25	"	"	"
Fourth	"	1.05	"	"	"
Fifth	"	0.00	"	"	"

To verify the above a number of experiments were made by adding a known quantity of hydrocyanic acid to previously exhausted bark and to other drugs like cinnamon. These were subjected to distillation under exactly the same conditions as in the preceding case, with the following results:

First distillate		56.	per cent.	of total	acid added.
Second	"	32.	"	"	"
Third	"	8.	"	"	"
Fourth	"	2.8	"	"	
Fifth	"	0.0	"	'	'

In no case could all of the hydrocyanic acid which was mixed with the powder be recovered. The loss was about one per cent.

Assay of Bark.

Average results of several estimations upon each sample of the bark:

Thick Bark.

First method, No. 1. 0.35 per cent. of hydrocyanic acid.
" " 2. 0.345 " " " "
" " 3. 0.34 " " " "
" " 4. 0.323 " " " "
" " 5. 0.348 " " " "
Second method, No. 1. 0.319 " " " "
" " 2. 0.323 " " " "

Thin Bark.

First method, No. 1. 0.24 per cent. of hydrocyanic acid.
" " 2. 0.264 " " " "
" " 3. 0.27 " " " "
" " 4. 0.268 " " " "
Second method, No. 1. 0.229 " " " "
" " 2. 0.238 " " " "

Yield of amygdalin (or allied substance).
Thick bark, average 4.12 per cent.
Thin bark, average 3.16 per cent.

Of the two methods given for the estimation of the acid, the first is the more accurate and satisfactory. Much care is required in manipulating the precipitate of silver cyanide in the second.

The yield of hydrocyanic acid as above stated is more than twice that previously reported. J. S. Perot (Am. Jour. Ph., Vol. 24, 1852, page 111) found from 0.0478 to 0.1436 per cent. We believe that the result is due to the improved method of estimation, as numerous experiments proved that only about half of the acid was obtained during the first distillation.

The above results appear to furnish to the query a negative answer.

Ann Arbor, Mich., June 15, 1895.

The following paper was then read and referred to the Committee on Publication:

ESTIMATION OF THE DIGESTION, OR SOLUBILITY OF HARD BOILED EGG ALBUMEN WITH TWO PER CENT. HCL, WITH PEPSIN ALONE, WITH DISTILLED WATER, AND WITH ARTIFICIAL GASTRIC JUICE.

BY C. C. SHERRARD, PH. C.

The object in making these tests was to verify, or disprove, the ideas of some theorists regarding the part played by the action of acids in applying the United States Pharmacopœia test in pepsin assays.

It has been claimed that the proteolytic value of pepsin is practically *nil*, and that the so-called pepsin digestion is due for the most part, or almost entirely, to the HCl present in the solution. The following report does not bear out this idea.

In applying the tests I used, in the first series of experiments, the same dilution as directed in the United States Pharmacopœia pepsin test, and all other conditions were observed with the same precision as in regular

pepsin assays. For explanation of precautions see paper on "Do the Pepsins of the Market Conform to the 1890 Pharmacopœial Requirements?" by C. C. Sherrard, Ph. C., and J. L. Tegarden, Ph. C.

Likewise, in ascertaining the digestive power of pepsin, without the aid of HCl, I used the same amount of pepsin and albumen directed by the United States Pharmacopœia. In determining the solvent property of distilled water on hard-boiled albumen, I used the same degree of dilution as in the former instances, observing the same restrictions, directions, etc. Fresh egg albumen, when dried at 90° to 100° F., yields an average of about 12.5 per cent. of dry albumen. Egg albumen, which has been boiled for fifteen minutes, will yield an average of about 13.5 per cent. of dry albumen.

10 Gms. of hard boiled egg albumen were used in each experiment, and, at the expiration of the six hours, the resulting product was filtered through a tared filter, washed thoroughly with cold distilled water, and then dried at 90° to 100° F.

WITH 2 PER CENT. HCL.

Twelve assays gave an average of 1.2322 Gms. of undissolved, dry albumen, representing 9.1274 Gms., or 91.27 per cent. of hard-boiled, undried egg albumen, thus showing that only 8.73 per cent. of the 10 Gms. are soluble in .2 per cent. hydrochloric acid, under the conditions of the United States Pharmacopœia pepsin test.

WITH 1 PER CENT. HCL.

Twelve assays gave an average of 1.1992 Gms. of undissolved, dry albumen, representing 8.8829 Gms., or 88.83 per cent. of the undried, hard-boiled albumen, showing that 11.17 per cent. dissolves in 1 per cent. hydrochloric acid, under the conditions of the official test.

WITH 5 PER CENT. HCL.

Twelve assays gave an average of 1.2160 Gms. of undissolved dry albumen, corresponding to 9.0074 Gms. or 90.07 per cent. of the weight taken, showing that 9.93 per cent, is soluble in five per cent. hydrochloric acid under the proper conditions.

WITH PEPSIN IN SOLUTION.

The pepsin was weighed, dissolved and diluted with distilled water to the same degree of dilution as required by the official test, no acid being used, other conditions remaining the same.

Twelve assays gave an average of 1.1949 Gms. of undigested dry albumen, corresponding to 8.8511 Gms. of the undried coagulated albumen, and representing 88.51 per cent. of the ten Gms. taken, thus showing that 11.49 per cent. is digested in the pepsin solution without the aid of the HCl.

WITH PEPSIN SOLUTION FOUR TIMES THE STRENGTH DIRECTED IN THE OFFICIAL TEST.

Twelve assays gave an average of 1.2273 Gms. of undissolved dry albumen, corresponding to 9.0911 Gms. of the undried coagulated albumen, and representing 90.91 per cent. of the weight taken, thus showing that 9.09 per cent. is digested in the quadruple pepsin solution without the aid of HCl acid.

WITH DISTILLED WATER.

Twelve assays were made, and gave an average of 1.1737 Gms of dry albumen, corresponding to 8.6940 Gms. of the undried coagulated albumen, and representing 86.94 per cent. of the weight taken, showing that 13.06 per cent. is soluble in distilled water alone, under conditions of the United States Pharmacopœia test.

WITH ARTIFICIAL GASTRIC JUICE.

Twelve assays were made, resulting in each case in the complete solubility of the albumen.

RECAPITULATION.

	Hard-boiled albumen.	Undissolved albumen, dried.	Undissolved undried albumen.	Per cent. of undissolved albumen.	Per cent. of albumen dissolved.
2 per cent. HCl.	10 Gms.	1.2322	9.1274	91.27	8.73
1 per cent. HCl.	10 "	1.1992	8.8829	88.83	11.17
5 per cent. HCl.	10 "	1.2160	9.2074	90.07	9.93
Pepsin sol. 5 C.c.	10 "	1.1949	8.8511	88.51	11.49
Pepsin sol. 20 C.c. ...	10 "	1.2273	9.0911	90.91	9.09
H_2O	10 "	1.1737	8.6940	86.94	13.06
Art. Gas. Juice.....	10 "	none.	none.	0.00	100.00

Because of lack of time more concentrated solutions of the acid and pepsin were not experimented with, but as the investigation of the subject has developed several interesting features, it is my intention to pursue it still further, not alone to establish these seemingly incontrovertible facts, but primarily to determine the quality and yield of albumen in a given weight of hard-boiled albumen as ordinarily employed in pepsin tests.

It is known that the percentage of dry albumen in eggs varies from 11 or 12 to 18 or 20 per cent.

A mere physical examination of the albumen of different eggs, boiled at the same time and under the same conditions, is alone sufficient evidence to convince one of a perceptible difference, even when the eggs are known to be absolutely fresh, that is, not more than one or two days old. In my experiments in drying fresh and coagulated albumen, I have found them to yield an average of a little more than 12.5 and 13.5 per cent., respectively, of dry albumen.

It should be remembered that the variation of the percentage of dry albumen in a given weight of hard-boiled egg albumen, and also the variation of soluble matter in the same, will show relative variations in the apparent solvent property of the menstruums employed, but these variations should always fall within the limits of the variation of the yield of the dry albumen and soluble matter present.

From a strictly technical point of view, this work is considered somewhat crude, but not so from a practical standpoint, which it is intended to demonstrate. To be exact we should be required to estimate the amount of moisture and soluble matter in a similar 10 Gms. of albumen, prior to testing the solvent properties of various dilutions of hydrochloric acid, water, and pepsin solutions, and if this were done, it would show somewhat lower results on the digestive or solvent properties of these menstruums.

Upon filtering the various solutions, obtained as above noted, and applying the peptone test, using Fehling's solution, diluted one part in four, the filtrate from the acid menstruum gave no perceptible peptone reaction; the pepsin menstruum gave a slight peptone color reaction, presumably due to the small amount of peptone previously existing in the pepsin; the water solution did not respond to the peptone test, but the three combined as artificial gastric juice gave a decided color reaction for peptone. This tends to emphasize the fact that the theory of complete gastric digestion, depending upon the entire conversion, if possible, of all the albumen into peptone, is a tenable one, and some simple and expedient device is evidently desirable to that end.

Prof. John Marshall, of Philadelphia, has done a great deal of valuable work on ferments, and I believe, has obtained peptone reactions by digesting purified fibrin in a sealed glass tube, with various strengths of hydrochloric acid, at high temperature; but this conversion is not apparently affected when the digestion is conducted under the conditions of the official pepsin test.

It often happens that we are required to make from one to several dozen pepsin tests at the same time, and it is next to impossible to so mix the divided egg albumen that the 10 Gms. for each test will represent exactly the same kind or quality. It could be done fairly well by thoroughly triturating in a mortar, but there are objections to such a procedure. First the albumen would be converted into a magma, and would then be more readily digested than as now prepared, and secondly considerable loss of moisture would ensue during the interval of trituration.

It would therefore, seem to be advisable, in the absence of a reliable method of estimating the amount of peptone formed, to devise some method for preparing pure albumen after a recognized standard. This might be accomplished by drying and powdering the albumen, and then standardizing it by some of the well-known reliable methods, prior to applying the pepsin test. This, of course, would introduce the original diffi-

culty, because boiled *dry* egg albumen presents altogether different physical characteristics than boiled *fresh* albumen.

While this paper does not solve the difficulty, or offer a feasible method, yet I thought by presenting the subject in this light some good might be done.

In accordance, however, with the facts herein noted, considerable experimental work has been undertaken, but has not resulted in anything sufficiently economical, simple and accurate for gravimetric work. Now that I have begun the work, I hope in the near future to be able to offer something more edifying upon the subject.

MR. HALLBERG: I see there is another paper very similar to this on the same subject. I hope it will not be read except by title. The subject of pepsin is one we are having altogether too much of, and I don't think the importance of the subject justifies so much time. No medical man of any particular standing now-a-days uses pepsin, and I think that as pharmacists we spend entirely too much of our time investigating the subject, and I, for one, do not care to hear anything more on the subject.

MR. SAYRE: I hope that no cold water will be thrown upon this investigation. If we discourage it in this Section, it seems to me we will check the progress of science. Now, the work that I have been doing—you might say where is the use of my bothering my time with taraxacin? None whatever. Very few ever use taraxacin, and they don't generally take very much stock in it when they do. Yet, I have the idea here that perhaps something will grow out of this investigation after all. Some new physiological ideas may come out in this investigation; and so it is in the investigations of pepsin. I don't think there is a more interesting field for investigation than physiological chemistry; and the nearer we can come to an understanding of what pepsin is, the nearer we can come to the solution of many questions we are aiming to solve at the present time. What is pepsin? If we could only settle that question to-day, it would be the greatest discovery of the age almost. And I say, let us encourage these people and not come up here after they have presented a paper upon a subject and say it is useless. Let the Committee determine that beforehand, and if the Committee finally brings it before this Section, we have no right to slap a man in the face for bringing up the subject.

MR. HALLBERG: I beg to say that I do not want my position misunderstood. This investigation is an unparalleled case. You will remember, the first paper Prof. Sayre presented; I took the ground that a series of investigations like those he was conducting, if not of any immediate practical value, may often be eventually of great benefit. The difference between an investigation like his and the present one is this: In the case of an investigation of drugs like taraxacum, and the investigation that Professor Lloyd and others have conducted, they are in a field which we may know practically nothing about, and they will lead to something valuable without doubt. In the case of pepsin, it is quite the contrary. It has reached the climax of its usefulness and popularity, and while I must say the paper presents the question very well, the succeeding paper relates only to the comparative digestive value, and I certainly, for one, am not interested in that.

MR. WEBBER: I would like to ask if the paper under discussion is not in reply to a query presented by this Section.

THE CHAIRMAN: It is.

MR. WEBBER: Then it ought to be read.

THE CHAIRMAN: The reading of the paper will be deferred until this afternoon, and the Secretary will announce the papers to be read at the afternoon session.

MR. EBERT: There must be some way to arrive at a solution of the difficulty we find ourselves in from year to year in regard to these papers. Would it not be well in sending out inquiries, to state to those who wish to make investigations, that if they will come to the meeting we would be pleased to have them come and read their papers, or if they cannot come, we would be glad to receive their papers, subject to the action of the officers of this Section who have this matter in charge; if these find their paper worthy of being read, have it read; if not, or if it is too lengthy, or if the author would give us an abstract of the paper, so that the abstract could be read, we could come here and listen to the reading of the papers by the authors who were present, and the questions that are put to them would bring out a great deal more in the discussions oftentimes than the paper itself, and make it much more interesting. You read a large number of papers here of scientific character, and you find that the audience gets tired. After that paper is read another paper comes up, and comparatively little discussion is brought out.

MR. MAYO: I have a suggestion to offer that I think will present a solution to the question. One of the principal reasons of the small amount of discussion is that we do not know what is going to be read, and those who are more or less familiar with the subject do not feel willing to get up and talk about it, the author having had so much time for preparation, and they having had possibly only a cursory resumé of it. Would it not be advisable for the Committee to announce beforehand when a certain paper would be read, and to distribute at the first general session of the Association copies of the papers which were to be read, so that the members who are present and interested in those matters may take those papers and look them over, and be prepared to come here and discuss them? It has been argued against this that if this be done, the members will not come and listen to the reading of papers which they have already had in their possession. I think that is erroneous, because if a man has not sufficient interest in a paper to come and discuss it under those circumstances, he would not participate in the discussion or attend the reading of the paper, at all, but would wait until they were printed in the Proceedings.

After some further discussion on the subject by Messrs. Hallberg, Merrell, Whelpley, Sayre and others, upon motion of Mr. Hallberg the whole matter of the presentation and reading of the papers was referred to the officers of the Section as a committee, to be reported upon at the afternoon session.

The Section then adjourned until 3:30 p. m.

SECOND SESSION—SATURDAY AFTERNOON, AUGUST 17.

The Section was called to order by the Chairman and the minutes of the preceding session read and approved as corrected.

The Chairman called for further nominations of officers.

MR. SAYRE: I shall be obliged to leave the room in a very short time, and I have a resolution which bears upon the suggestion contained in the address of the chairman that I will present now, if I may have the consent of the chair.

Permission being given to take this up out of its order, Mr Sayre said:

Your Committee on the chairman's address would make this report, and in making it I wish to state that the Committee has made it in the form of a resolution which I will read:

"*Resolved*, That this Section appoint a sub-committee known as Special Research Committee; that this committee shall consist of three members of this Association and the Chairman of the Scientific Section and the Chairman of the Revision Committee, the two latter being ex-officio members. The said Committee shall have charge of any special investigation which in their discretion is within the province of the Section on Scientific Papers. It is recommended that this Committee shall receive such encouragement financially as is necessary to advance this work, subject to the approval of the Council."

L. E. SAYRE,
A. B. PRESCOTT,
C. L. DIEHL,
Committee.

The reason the Permanent Secretary was not included in this Committee in accordance with the suggestion of the Chairman, was that we felt he was already overloaded with work, and we did not wish to ask him to do further work for which he undoubtedly has not the time. As there is nothing said in the resolution regarding the appointment of the Committee, I would personally suggest that it be appointed by the present chairman.

Upon motion of Mr. Hallberg, the resolution presented was adopted, and the Section then proceeded to further nominations for officers.

DR. WHELPLEY: I would like to place in nomination for Chairman of this Section a person so well known to you as to make an introduction unnecessary. I refer to Professor Albert B. Prescott, of Ann Arbor, Michigan. Seconded.

MR. PRESCOTT: I would say to my fellow members of this Section that I appreciate the kindness which prompted the making and seconding of this nomination, but it would be my preference to be allowed to act my part in the Section, as well as I can, without office, without executive duties in the sessions. I am not quite certain as to where I shall be at the next meeting; I may be able to be present, but I may be too far away next year at this time. In view of this uncertainty, and especially in view of my desire to be relieved from executive work as far as I can, so that I may give more time to the scientific work, I would request either that my nomination be withdrawn or that I be allowed the privilege of declining.

DR. DOHME: Before these nominations are closed, I would like with the consent of the gentleman who nominated me to withdraw my name, in order not to establish a precedent of nominating the same Chairman for a second term. I would like to have a motion to that effect from some member.

MR. HALLBERG: It seems to me that while a one-term president is a very good thing in national and political affairs, it is a very good thing to give two terms to executive officers of this Section.

MR. EBERT: I am very glad to hear just what the Chairman has said and I approve of it heartily. There are a great many of us here who have not held any very distinctive office, and we all want to hold office sometime, and I have had a hankering for it for some time myself. As our Chairman has asked it, I hope we will respond by allowing him to withdraw at this time. I think after he has been on the floor with us for a year—and in that interval he will do good work—the coming year, if we haven't good material who

have not held the office, we can elect him again. I fully appreciate the work he has done, but I also appreciate his sense of modesty and fairness in the matter.

There being no further nominations for Chairman, nominations for Secretary were called for.

MR. KAUFFMAN: I ask that my name be withdrawn for secretary, in accordance with this idea of rotation in office, and in accordance with my own desire.

MR. ALPERS: I nominate Mr. Ebert for Secretary, as he has indicated that he desires an office.

MR. EBERT: I nominate Mr. Alpers, as long as he has shown the desire to bestow honors upon me. Seconded.

Mr. Eliel was nominated by a member.

MR. ALPERS: I appreciate the honor conferred, but have to withdraw my name. I prefer not to accept the office.

THE CHAIRMAN: If there are no further nominations for Secretary, the nominations will be closed. They are closed. Gentlemen, you will please prepare your ballots and ballot for Chairman of this Section.

DR. SIMON: If I understand correctly, we have but one nominee for Chairman, Professor Sadtler; and for that reason I move that the election be made unanimous and the Secretary be instructed to cast the vote of the Section for Chairman of this Section. Seconded and carried.

Thereupon the secretary cast the unanimous vote of the Section for Samuel P. Sadtler of Philadelphia, for Chairman for the ensuing year.

There being two nominees for Secretary, a ballot was ordered, and a vote being taken resulted in the following count: For Mr. Alpers 27; for Mr. Eliel 11. Mr. Wm. C. Alpers, of Bayonne, New Jersey, was declared the choice of the Section for Secretary for the ensuing year.

The next business in order being the report of committees, the chairman called for action on the report of the committee to recommend an alteration of the by-laws in reference to limiting debate, etc.

REPORT OF THE COMMITTEE.

Your Committee beg leave to recommend the adoption of the following resolution:

Resolved, That the Association be requested to amend Article VI of Chapter IX of the By-Laws by adding the following words: "In order to facilitate procedure and discussion in meetings of this Section, the time allowed for the reading of each paper shall not exceed fifteen (15) minutes and if more time be necessary, the author shall prepare an abstract of the paper and read it instead. Discussion shall be unlimited in extent, but must be confined to the subject; and papers, the authors of which are present at the meeting, shall in all cases be given the preference."

A. R. L. DOHME,
GEO. B. KAUFFMAN.

It was moved to add the words, "except by consent of the majority of

the members present," in referring to the time of each paper being limited to fifteen minutes in its presentation, and that "copies of the papers be furnished the Association at the first general session thereof." With these additions to the original resolution presented by the Committee, the resolution was adopted.

THE CHAIR: The next thing in order is miscellaneous business, and under that head would come a discussion of the report of the Committee on the Revision of the United States Pharmacopœia which was referred to this Section. I would like to have its Chairman, Mr. Eliel, if he be present, as he said he would be, take this matter up. I think the motion to commit the report to this Section included the taking up of each section seriatim. If the Section agrees to that, we will have to take it up seriatim.

MR. OLDBERG: I move that the reading of the report be dispensed with. This is one of the reports we cannot consider sitting here as we do, on the spur of the moment. We must see the report in print, and then we can think over it and act intelligently upon it. I, therefore, move that the report be referred to the Publication Committee.

MR. REMINGTON: There is one objection to that. The main reason the report was referred to this Section was to save the time of the General Session. It seems to me that the function of this Session is to discuss these matters in detail. That is what the Section is for, and there are some points in that report we will not have an opportunity to discuss unless we do it here. I think what Professor Oldberg has said is right in regard to a good many of the points. There are some matters there which have been brought up that would require a good deal of thinking in order to discuss them intelligently, but there are some points that I think ought to be discussed at the present time. No one has any chance to say anything unless it is said here, and it seems to me it would produce as much interest as anything we can have. They are practical subjects, and there are many men here who have practical opinions on these subjects. I don't want to take up the time of the Association, but these are practical points about the Pharmacopœia, and it occurs to me that nothing would be of more interest to the members of this Section at large than to have a chance at some of these subjects; and while we are limited to three minutes, if the reader of the report would be willing to mention the subject and state it as briefly as possible, and then have a discussion on the subject I think we could get through it very rapidly.

MR. OLDBERG: I think there is no second to my motion.

THE CHAIRMAN: I have heard no second to the motion. Consequently, the next thing in order would be the further reading of the report.

MR. OLDBERG: I am still of the opinion that the reading of this report should be dispensed with. Unless it is of immediate importance, it should be printed before it is discussed. If it is desirable to save the time of the General Session, it is also desirable to save the time of this Section. We have a number of papers to be read, many of them such as should not be postponed and cannot be postponed.

DR. WHELPLEY: We are losing valuable time, and I move that we proceed with the discussion of this report, which is as valuable a paper as we will have before us.

This motion being seconded and carried, Mr. Eliel proceeded with the reading of the report as follows:

"We recommend that granulated opium be used in the preparation of tincture and

the deodorized tincture of opium, and that the use of precipitated phosphate of calcium, be omitted in their preparation."

MR. HALLBERG: I move the adoption of that, and I can do that right now without further consideration of the question. That is the specific recommendation of the Illinois Pharmaceutical Association adopted in 1888, and transmitted to the Convention for the Revision of the Pharmacopœia. It was not acted upon for some reason or other, although it had been demonstrated from the beginning that the finely powdered opium was not proper to make tincture of opium from. There is no necessity for using phosphate of calcium. It hinders the extraction of opium. It makes it practically impossible to completely exhaust the opium, as has been demonstrated by the examination made chemically by the members of the various State associations, and especially in the Missouri State Pharmaceutical Association.

MR. REMINGTON: Of course, in the Convention we get the views of the various members throughout the country as they are expressed, or by communications through the various State organizations. When the Committee considered the subject of tincture of opium, innumerable letters came, stating that granulated opium was not to be had, it could only be obtained in the powdered form. Why don't you get up a formula whereby powdered opium can be used, which can be had in every drug store? Many druggists throughout the country take the ground that we make tincture of opium from opium because we cannot get either powdered opium or granulated opium; but, of course, such objections are not to be considered. Powdered opium can be had, and granulated opium can also be had. Then, again, a formula in which powdered opium can be used, owing to its fine state of division, together with the use of precipitated phosphate of calcium which will permit its more ready percolation, does produce a tincture of opium which will assay a larger proportion of morphine than when it is not used. These matters were gone over fully by the Pharmacopœia Committee, and I am convinced that granulated opium, taken all over the country — not in the hands of Professor Hemm, or Professor Hallberg or myself, but in the hands of the druggists all over the country—will not yield as good results.

MR. CASPARI: I have had several druggists try the method of using powdered opium and precipitated calcium phosphate, and not one failed to condemn the formula of the 1890 Pharmacopœia. Unfortunately, a large proportion of the druggists do not make tincture of opium at all, and this is probably due to the fact that they cannot make it successfully by the formula given. I am sorry I have to differ with Prof. Remington with regard to the use of granulated opium. I have been very successful with it. I have used granulated opium, and while it has not been on the market generally, there has been no difficulty in obtaining it in the larger cities. I think this is a movement in the right direction, and will be appreciated by all apothecaries who make their own preparations.

A MEMBER: I do not rise to say anything against the granulated opium, but I do rise to speak against any positive decision upon this question now. I had the good fortune to attend the last meeting of the Missouri Pharmaceutical Association, where Professor Hemm read his paper on this same subject. After the reading of the paper, a gentleman arose, as has Mr. Remington, and stated that he had used the precipitated phosphate of calcium, and had obtained results which Professor Hemm had not obtained. Now, I suggest this as the cause of the difference: On the market we will find a very impure product known as phosphate of calcium. It is very largely contaminated with ammonium chloride, and the presence of this impurity is very often the cause of the difference in the amount of morphine obtained. But pure phosphate of calcium, if it

is used by the operator, will give, to my positive knowledge—of course, I have tried the experiment myself—will give good results; but there always comes in every experiment of this kind a personal equation. Some men will work best with one material, and some best with another. I simply rise to ask that while we sit here in this small body to decide upon a question of this sort, let us weigh it and hear more from the State Associations and others before we say positively through the Revision Committee that we want this thing changed.

Mr. Eliel here continued the reading of the report of the Committee as follows:

"We recommend that such of the Medicated Waters as are now directed to be made by trituration with precititated phosphate of calcium, be made either by agitation of the oils with hot water and subsequent filtration, or by use of a double filter, the inner one a size smaller than the outer, and evenly saturated with the oil, and the outer one wetted.

"We recommend experiments with dextrine syrup or glucose in the place of glycerin, in the preparation of fluid extracts containing resinous matter. We also recommend experiments with acetic acid in the manufacture of fluid extracts and tinctures, to replace, in part at least, the alcohol now directed to be used.

"*Soap Liniment.* Numerous complaints have been made that the liniment became solid at the ordinary temperature of the room. This should be investigated. Either the castile soap used is not pure, or the quantity directed by the Pharmacopœia is too great."

MR. REMINGTON: You do not wish a vote of the Section, I suppose, on these subjects. I suppose this is the report of the Committee, and the only object I had was simply to have some discussion, that was all. I do not assume at all that that report is the report of the whole Association; it is the report of that Committee, and as long as the other side is heard it seems to me that that is all that is necessary.

MR. SEABURY: We have a motion before us. Mr. Hallberg made a motion.

MR. HALLBERG: I am perfectly willing to withdraw it if it is the wish of the Association, or if it is not desirable to vote on this. I think possibly however, when we get through with this we might refer it to the National Committee, with our endorsement of approval, or reject it.

MR. ALPERS: Should we not endorse or reject each section? We should certainly vote on each part of it, because we may wish to endorse ten of these recommendations and not the eleventh, and we could not cover it by a final endorsement.

MR. REMINGTON: These subjects are those upon which many of us cannot have an intelligent opinion until we have gone over and experimented ourselves, and I think possibly it would be better for the report to be received as the report of this Committee. We need not take any action either endorsing or condemning any of the views of this Committee. That will be turned over to the Committee on the Revision of the Pharmacopœia. At that time there will be plenty of time to take up and discuss these questions. Some have found one thing better and some have found another thing better. It will all go in for the consideration of the Committee, and I will answer that the Committee will go all over the ground and sift the matter thoroughly before the next revision of the Pharmacopœia.

MR. OLDBERG: I am sure that the reference of this report was accompanied by a motion that was passed in the General Session directing the reference of this report to the Committee on the Revision of the Pharmacopœia. There is where this report belongs.

MR REMINGTON: It was referred by the Association directly to this Section, and this Section can do what it pleases.

MR. MAYO: It was referred by the General Session to this Section and to the Committee on Revision.

THE CHAIRMAN: Is it your desire that this paper be read entire?

MR. REMINGTON: I know that there are some more important points further on in the paper, and I would suggest that it be read until some subject comes up which seems to invite discussion.

Mr. Eliel continued the reading of the report as follows:

"*Aloin.*—The test should be modified to include the melting point and the solubilities should be changed.

"*Potassium Ferricyanide.*—Pages 477–520, the chemical formula should be $K_6Fe_2(CN)_{12}$ instead of $K_6Fe(CN)_{12}$.

"*Sodium Hypophosphite.*—Page 360, second line, second paragraph, should read Mercuric Chloride instead of Ammonium Chloride.

"*Acetanilid.*—Under tests, the term isonitril means nothing, and should be superseded by phenylisocyanide.

"*Termination ol* should be limited to phenols and alcohols and should not be applied to aromatic hydrocarbons which have a generally applied English termination. This is *ene*. Hence benzol and toluol should be respectively benzene and toluene.

"*Hydrochlorate and Hydrobromate*, as representing salts of hydrochloric and hydrobromic acids, are incorrect, and should be Hydrochloride and Hydrobromide.

"*Chloral*, as a heading for something that is not Chloral but Chloral Hydrate, is an error. The heading should be Chloral Hydrate.

"*Atropine.*—Melting point should be 115° C. instead of 108° C.

"*Coca Leaves.*—Distinction should be made between Erythroxylon Bolivianum (Huanuco Leaves) and Erythroxylon Spruceanum (Truxillo Leaves), as there is a microscopic difference in the leaves, and a decided difference in the yield of alkaloid. (See Proceedings American Pharmaceutical Association, 1893, Vol. 41, page 159). A standard should be adopted for this drug and a method of assay devised.

"*Stramonium Seed* should be superseded by Stramonium Leaves and stems, and this for two reasons—they contain less alkaloid than stems and leaves, and contain so much oil that they make bad preparations to mix with others without precipitation, do not keep well, and require a stronger alcoholic menstruum than the stems and leaves.

"*Tincture of Strophanthus*, and *Tincture of Colchicum Seed.*—The seeds for the preparation of these tinctures should first be deprived of their oil.

"*Gold* and *Sodium Chloride.*—Why use a mechanical mixture when a definite chemical compound of both exists, the double chloride of gold and sodium, $AuCl_3 3NaCl$.

"*Tartar Emetic.*—Why Antimonii et Potassii Tartras, when it is known that the compound is Antimonyl Potassium Tartrate?

"*Carbonates of Ammonium, Magnesium and Lead* are so called when it is known that all are really the basic carbonates, and when the formulas for the basic carbonates are given under the names.

"*Hydrastis Canadensis* should be assayed and required of a certain strength of hydrastine.

"*Hydrastine Hydrochloride* should be made official, as it is used to a great extent and much more than the hydrastinine salt.

"*Powdered Opium Assay.* Insert after 'another portion of 10 C.c. of ether' the words: 'let the ether on the filter and crystals evaporate completely,' and after the words

'more than about 10 C.c. in all' insert the words 'use a feather to remove the crystals that adhere to the flask.'

"*Pilocarpus.*—Distinguish between hairy and smooth jaborandi leaves, introduce method of assay, and set up a standard of requirement of pilocarpine for the leaves.

"*Solution of Citrate of Magnesia.*—This formula is far from satisfactory. Numerous complaints have been received, and those who are satisfied with the present formula, are so only because they have tried no better. In a paper read before the Michigan State Pharmaceutical Association by Messrs. A. B. Stevens and W. Palmer, the following formula was presented:

Magnesium Carbonate	13.0
Citric Acid	26.5
Oil of Lemon	0.128
Sugar	62.0
Potassium Bicarbonate	2.0
Distilled water	Q. S.

"Dissolve the acid in 250 C.c. of water, add the magnesium carbonate which has been previously triturated with the oil of lemon; when dissolved, filter the solution into a strong bottle having a capacity of 360 C.c., then add enough water to nearly fill the bottle, drop in the potassium bicarbonate, immediately close the bottle with a cork, and secure it with twine.

"*Sapo Mollis.*—The formula for this preparation is far from satisfactory. The product is unsightly, and, upon standing, develops an objectionable odor. It is largely used in surgical practice, and the formula hereby offered to take its place has been in use by the Chairman of this Committee for many years.

Olive oil	1000 C.c.
Potassa	360 Gm.

"Dissolve 360 Gm. of the potassa in 2000 C.c. of water, and add 500 C.c. of this solution to the oil in a suitable vessel, place over a moderate fire, stirring until the mixture has thickened sufficiently. Gradually add the remaining solution of potassa and continue the heat, stirring occasionally until the mixture assumes a transparent gelatinous form. Dissolve the remaining 60 Gm. potassa in 1000 C.c. of water, add to the mass and evaporate to proper consistency.

"Samples of this preparation, as well as the liniment made from it, are hereby submitted."

Mr. Remington moved that the report be received and placed in the hands of the Publication Committee, and that a copy of same be sent to the Committee on the Revision of the Pharmacopœia.

Seconded and carried.

The following paper was then read, and, upon motion, was received and referred to the Publication Committee:

NOTES UPON SOME PHILIPPINE ISLAND DRUGS UNDER ANALYSIS FOR ALKALOIDS, ETC.

BY ALBERT B. PRESCOTT.

From the Laboratory Work of Elgin Mallett, Ph. C., and F. M. Marsh, Ph. C.

By the courtesy of Mr. Oscar F. Schmid, of the drug house of the Weeks' Drug and Chemical Company, of Jackson, Mich., this interesting

collection of drugs was given me for examination. All the articles have repute for medicinal virtue among the native people of the Philippine Islands. The collection was made by an exploring company from this University. This exploring company went to the Philippines to continue the work of Professor Joseph B. Steere in natural history, and with the benefit of his experience and direction. For all the information which we can give as to the source and native reputation of the drugs, we are indebted to Professor D. C. Worcester, of this University, who was in the exploring party that made the collection. And I should say that the collection in my hands consists only of certain representative samples of the stock obtained from the Philippines and now in the hands of the Weeks' Drug and Chemical Company, at Jackson.

It was the first object of the work so far undertaken upon the drugs, to find whether each one contains an alkaloid or not. Other distinctive principles, resins, acids, etc., were to be sought for when time would permit, and a few results were so obtained, as reported below, but further work is desirable upon the non-alkaloidal principles, and I expect to have this work done during the next college year. It may be found expedient to make a full plant analysis of some of the articles. It will be still more important to make a full chemical examination and analysis of any distinct principles of interest not previously known.

Leaving the botanical determination of the plants to other hands, they will be designated in this report by the English spelling of *their native names*, and by these alone.

The method of analysis for alkaloids was in general as follows, subject only to minor variations dependent upon the differing character of the drugs:

(1) The drug reduced to a fine powder was digested on a water bath, in a flask fitted with a small return condenser, with about fifty parts of alcohol to which about one-twentieth part of sulphuric acid had been added, for several hours.

(2) The contents of the flask were strained through muslin, and then filtered clear. The filtrate then placed in an evaporating dish and concentrated on a water-bath to about five parts. Sufficient water was then added to precipitate resins and other plant constituents, which were then removed by filtration.

(3) The filtrate obtained was placed in a separator and shaken out several times with an equal volume of chloroform to remove coloring matter, etc. The chloroform was then evaporated and the residue examined.

(4) The watery solution in the separator was then made alkaline to litmus and immediately shaken out with three to five portions of an equal volume of chloroform and the chloroformic solution reserved (Extract I.). This was then followed in the same manner with amyl alcohol (Extract II.).

(5) The chloroform of "Extract I." was evaporated and the residue dissolved in hot water acidulated with sulphuric acid. The whole was then filtered and reserved for tests. "Extract II." was treated in the same manner.

(6) The filtrates were first tested for alkaloids by the following general reagents: iodine in potassium iodide solution, Mayer's reagent, phosphomolybdic acid, bromine water, tannic acid, and picric acid, and the test tubes set aside for several days to allow precipitation to take place. In the mean time various tests for the more common alkaloids were applied, and any color reactions noted.

The following named drugs were analyzed by the method given above. With these drugs first below described no reactions for alkaloids were obtained, their medicinal activity being doubtless due to other plant constituents, requiring further examination. The work was very faithfully performed by Messrs. Mallett and Marsh, who made the operations together with two-fold security against inexactness in execution. The results are given in their own language, as is also the external description of the drugs.

Dolulugai.—A seed of a light slate color and having a very hard testa. It is nearly spherical and about half an inch in diameter. The kernel is of a very solid texture, having a characteristic odor and a bitter taste. It is said that the natives of Phillipine Islands dissolve the powdered dolulugai in vinegar and employ it as a specific for all pains of the stomach, also as a poultice in rheumatism. It was said to contain strychnine, but this is positively not so, since on analysis it gives entirely negative results. The principle constituents found on analysis were fixed and volatile oils.

Mountain Cinnamon.—A bark from one-fourth to one-half an inch thick, of a dark brown color and having an odor resembling a mixture of spices rather than the true cinnamon. It contains an aromatic volatile oil, tasteless resins, and a very large amount of coloring matter.

Manugal.—A very hard fibrous rhizome with rootlets, used by the natives as a stomachic, also as a purge by boiling thin shavings of it in cocoanut oil. It contains no alkaloids, but has a considerable portion of acid resins.

Vita.—A bark of a very thick, coarse texture used as a remedy for fevers. Nothing was found to which its medicinal properties could be ascribed.

Macbujai.—From parts of drug in our possession we are unable to determine to what plant organ it belongs. It contains considerable resin, coloring matter, and other plant constituents. The drug is excessively bitter and is used in the form of a decoction as a remedy for fevers.

Tagalaoi.—Small branches or shoots having a bark about one-sixteenth of an inch thick. The only important principle noted was a thick balsam-like resin. It is used as an antiseptic. The usual mode of application is

to boil the inner bark in cocoanut oil, and then use it in the treatment of wounds.

The work done on the above mentioned drugs was, as far as the presence of alkaloids is concerned, of a decided, negative character. None of the plants gave the slightest trace of their presence.

Arbutra—Samples of this drug in our possession consist of billets, about one and one-half inches in diameter and several feet in length, of a tough, fibrous wood, having a very characteristic cross section not unlike pareira brava. The wood beneath the bark is of a uniform yellow color. Upon extracting with acidulated alcohol, and purifying the extract by the process previously given, the solution containing the alkaloids as sulphates gave heavy precipitates with all of the general reagents for alkaloids.

From the fact that it colored the chloroform yellow when shaken out from the water solution we were led to believe that the alkaloid was berberine, and by carefully conducted tests this was verified. It responded to all tests for that alkaloid, and we were able to produce the hydrochloride under the microscope.

As to whether a white alkaloid is present as in many other berberine bearing plants, we are unable to say. The limited quantity of material and small percentage of alkaloid present was insufficient to attempt a separation, while there was not time to obtain more drug. The amount of berberine, or total alkaloid, if another be present, was determined in the following manner. A portion of the drug (5 Gms.) was weighed out and mixed with 2 Gms. of magnesium oxide, the whole was then carefully transferred to a Soxhlet extraction apparatus and extracted with a mixture of alcohol and chloroform (1–3), until exhausted. The extract was then placed in a separator and shaken out with dilute sulphuric acid. The combined acid solutions were then made alkaline with ammonia and shaken out until all coloring matter was removed. The combined chloroform washings were evaporated to constant weight in a tared beaker, and the amount obtained by this process was one-tenth of one per cent.

Ann Arbor, Mich., July, 1895.

The next paper read was that by Mr. Sherrard on the character of the pharmacopœial pepsins of the market.

"WHAT PERCENTAGE OF THE UNITED STATES PHARMACOPŒIAL PEPSINS OF THE MARKET COME UP TO THE PHARMACOPŒIA REQUIREMENTS?"

BY C. C. SHERRARD, PH. C., AND J. L. TEGARDEN, PH. C.

INTRODUCTORY REMARKS.

Comparative valuation tests of pepsin may be made in various ways. It is claimed by some writers that the United States and British pharmacopœial and allied methods of ascertaining the real activity of pepsins are faulty, and many, or all of them, overestimate the true value of pepsin, and

that albumen, to be completely digested, must be converted wholly into peptone by the action of the pepsin. From a scientific standpoint this is, no doubt, true; but in the absence of any thoroughly reliable method of estimating the amount of peptone thus formed, all pharmacists and physicians are compelled to rely upon the method recognized by all the leading pharmacopœias of the world, viz., of estimating the apparent digestion of a given amount of hard-boiled egg albumen by a given weight of pepsin, under certain well-defined and restricted conditions. For the sake of comparison, these old and recognized methods are as valuable as any other method, since each and every pepsin must be submitted to exactly the same conditions, and if each *is* subjected to precisely the same conditions, the relative merit of the one may be compared with that of others. Specific methods are outlined for making these tests, and if followed strictly, no two assayists should arrive at divergent results. Difference in results is a sure indication of ignorant or careless manipulations. If the chemist or operator is following the United States Pharmacopœia process, every condition as to boiling the eggs, weighing, the division of albumen, measuring, mixing solutions, controlling temperature, agitating, etc., must be strictly adhered to, for any slight variation in any one or more of the details will show different end results. Currents of air from the room, or windows, or other openings, should be prevented from coming in contact with the bottles during the digestive process. Few pharmacists or physicians have the proper facilities, time and practical experience to do the work with the accuracy and care it deserves, and because of these facts we sometimes hear of different results as to the quality of certain pepsins.

CHARACTERISTICS OF A GOOD PEPSIN.

The distinguishing features of a good pepsin are as follows: The odor and taste should be characteristic of a pepsin, but should be sweet and pleasant, without any suggestion of animal or mucous odor; the latter in time causing the repulsive and nauseating putrescent odor and taste so prominent in some pepsins, and being itself very unstable, causes rapid decomposition and putrefaction of the pepsin. The taste should, therefore, be pleasant and appetizing, and a rank-smelling pepsin should be rejected, as decomposition and putrefaction have set in. In external appearance pepsin should be in beautiful fluffy silver to nearly white scales, or in nearly white powder. It should also be non-hygroscopic, or very slightly so, under ordinary or natural conditions, and readily and completely soluble in water, without imparting a cloudiness or milkiness, the latter being an indication of mucus, or putrefactive matter, or both. In short, a good pepsin should be perfectly and readily soluble, free from mucus, non-hygroscopic, free from peptone, and sweet and agreeable in odor and taste. A pepsin that is hygroscopic and gums up contains more or less of either mucus or peptone, or both. It is true, however, that any

pepsin is affected to a greater or less extent in very humid climates at a high temperature, consequently a product which will stand all the requirements in a temperate climate, may not stand the same tests in low latitudes having a hot and very damp climate.

MATERIAL REQUIRED, AND PRELIMINARY PREPARATIONS FOR APPLYING THE TEST.

Apparatus.—Analytical balance, burette, cylinders, bottles with stoppers, sieve, cotton cloth, thermometer, containers for holding the bottles, rice paper, Bunsen burner, or any reliable method for producing and sustaining the proper temperature, pepsin, fresh eggs, hydrochloric acid, distilled water.

Preliminary to, and in the course of applying the tests, the operator should observe carefully the following salient points:

He should have access to a good analytical balance, carefully adjusted, and sensible at least to one milligram, better one-tenth of a milligram. The pepsin should be weighed on counterpoised paper, and for this purpose rice paper, such as that used for cigarettes, cut in pieces about two and one-half inches square, is very serviceable. These papers should be previously dried, and then handled with pincers to avoid moisture being absorbed from the hands. Lay one paper on each side of the balance, being careful to place the heavier one upon the left pan, and then adjust the balance with the rider. In our assays we weigh out .134 Gms. of pepsin, this being double the amount directed by the Pharmacopœia ($2 \times .067 = .134$). We, therefore, make up double the volume of solution A. The reason for using .134 Gms. of pepsin is that if any possible slight error occurs in weighing, the error is divided by two in the subsequent work. There should be no objection to this precaution, for instead of introducing an error, it has a tendency to correct one. The weighing of the pepsin must be done as quickly as possible, and in a dry atmosphere, to avoid absorption of moisture in case the pepsin should be at all hygroscopic. If the pepsin should be in the least hygroscopic, and by reason of careless or slow weighing any moisture is taken up, the end results will be vitiated to an appreciable extent. This was particularly noticeable in one fairly strong pepsin, which was decidedly hygroscopic, and while this article was one that should be condemned, yet to give it its proper standing especial care had to be used in this direction. The rice paper which contains the weighed pepsin is loosely and carefully folded, and dropped into an 8 ounce bottle. 200 C.c., or twice the official amount of .2 per cent. hydrochloric acid, is then run in, and the pepsin dissolved by brisk agitation. The paper used in weighing does not interfere in the least with subsequent work, and by placing the paper and pepsin both in the bottle, the very common error of losing more or less pepsin by brushing or shaking the pepsin from the paper or scale pan into the bottle is avoided.

A 25 C.c or 50 C.c. burette, or pipette, graduated to $\frac{1}{10}$ of a C.c., should be used in measuring the 5 C.c. of pepsin solution B., in making solution C.

Two C.c cylinders, holding 100 to 250 C.c. respectively, should be at hand for making up solutions A and B. The sieve should have 30 meshes to the linear inch, no more and no less. On this point a very important fact rests, as slight differences in degrees of division of the albumen yield very different results.

Another very marked error occurs, probably more often than any other, in preparing and weighing the albumen. The eggs should be as fresh as possible, and should be placed in the water while it is boiling briskly, and then allowed to boil exactly 15 minutes. To avoid breaking or cracking the shells, place the eggs in an improvised cotton bag, and suspend them entirely immersed in the boiling water. Observe, also, all the United States Pharmacopœia directions at this point. If the weather should be quite warm, rapid evaporation of moisture from the divided egg albumen takes place during the weighing process. In order to avoid this, take two cotton cloths, and immerse them in water, then wring the water out of them until they appear to contain about the same amount of moisture as the albumen itself. Allow the albumen as it is forced through the sieve to fall upon one of these damp cloths, and as soon as that part of the work is completed, cover the divided albumen with the other dampened cloth, and allow the albumen to remain exposed directly to the air only long enough to remove albumen sufficient for weighing 10 Gms. This precaution is very essential if several assays are to be made, for otherwise, with rapid evaporation going on, the first 10 Gms. would contain much more moisture, and less albumen than subsequent ones, and consequently would be digested sooner.

The United States Pharmacopœia does not define the kind of water bath to be employed, but does direct that the temperature should be maintained at 38° to 40° C. This is very essential, and can easily be accomplished by having a double bath, both filled to the proper depth with water, and then heat applied to the outer one. By this means fluctuations of temperature can be averted. The temperature of the inner bath is then brought to the proper degree, and the source of heat so adjusted that it will remain constant, a thermostat being serviceable at this point. This is all done preparatory to mixing the pepsin solution with the albumen. Between the intervals of shaking, the container should be kept covered with a piece of paste-board, or some other convenient cover, to prevent currents of air from coming in contact with the part of the bottle which remains above the surface of the water.

For comparative tests the pepsins should be bought in the open market, in unbroken sealed packages.

It is no more than fair to repeat the assay at least once, running a

duplicate each time. This has invariably been our custom, furthermore fortifying our ultimate decisions by running a duplicate of a pepsin which has been previously assayed and known to be a good 1–3000.

At the end of the six hours it is stated that "only a few insoluble flakes" should remain undissolved. This is another instance where the exercise of good judgment is necessary. At this stage of the operation the solution should be perfectly clear, with but very few of the thin flakes referred to. A cloudiness or milkiness, which with some pepsins is very pronounced, is an indication of incomplete digestion or conversion of the albumen into peptones, since the peptone solution is quite clear, whereas albumen in solution is of a milky condition.

We have thus gone into considerable detail to bring out and emphasize the many little particulars, and more or less technical points to apply this test properly, and do justice in every instance.

In our investigations all the necessary precautions have been strictly adhered to, and no modifications have been employed, but we have suggested a few schemes whereby errors may be avoided.

In conformity with the significance of these details, we purchased different brands of pepsin upon which we report as follows:

Numbers.	Description of Physical Properties.	Claim.	Actual Strength.	Solubility.	Odor.	Taste.	Reaction.	Peptone Impurity.	Insoluble Matter, Mucus, etc.	Hygroscopic Property.	Market Price, per ounce.	Price which should be asked based upon the Actual Strength and Strength Claimed, & Market Price. (*a*)	Price which should be asked based upon the Actual Strength compared with the Market Price and with a fifty cent (.50) pepsin, full U. S. P. Strength. (*b*)	Actual amount saved per ounce calculated upon the Market Price, Actual Strength, and a good U. S. P. Pepsin at fifty cents (.50) per oz. (*c*)
1	Yellow, transparent scales.	1–3000	1–2350	Slightly cloudy.	Fairly good.	Saline, good.	Acid.	Moderately strong test.	Very little.	None.	$0.75	$.58¾	$.39⅙	.459
2	Fine white powder with yellowish tint, 20 to 40 times strength saccharated pepsin.	1–9000*	1–75	Very cloudy with some insoluble matter.	Putrid, "piggy."	Saline, sugary, and sl. bitter.	"	Faint test.	Considerable.	None.	.60	.005*	.004⅙*	23.500*
3	Fine white powder with yellowish tint.	1–3000	1–2900	Very milky with some insoluble matter.	Rather putrid.	Saline, "piggy," repulsive.	"	Moderately strong test.	Considerable.	Very slight.	1.00	.96⅔	.48⅓	.5345
4	Fine granular, yellowish powder.	1–3000	1–1650	Clear solution but sl. am't residue.	Putrid, "piggy."	Repulsive, nauseating.	"	Faint test.	Very little.	Very hygroscopic, gummy.	.70	.38½	.27½	.773
5	Faint yellow, inclined to silvery transparent scales.	1–3000	1–3000	Clear solution, no residue.	Sweet, pleasant.	Saline, pleasant, appetizing.	"	Faint test.	None.	None.	.50	.50	.50	.000
6	Light, silvery, transparent scales.	1–3000	1–3000	Milky solut'n, no residue.	Sweet, pleasant.	Saline, pleasant, appetizing.	"	Moderately strong test.	Very little.	Very slight.	1.25	1.25	.50	.750
7	Yellowish white powder.	1–2000 or more.†	1–1125	Appar'lybut little of this pepsin dis.	Unpleasant, aromatic.	Fairly pleasant.	"	Moderately strong test.	Almost entir'ly insoluble.	Very slight.	.75	.28⅛†	.18¾†	1.500†
8	Golden color, broken scales.	Standard test.‡	1–800	Verycloudy, some residue.	Somewhat putrid	Unpleasant, mucous.	"	Faint test.	Considerable.	Very hygroscopic, gummy.	.50	.13⅓‡	.13⅓‡	1.375‡
9	Coarse, granular, brownish-yellow powder, broken scales.	1–2000	1–500	Very milky, large am't of insol. matter.	Rather putrid and "piggy."	Bitter, unpleasant.	"	Moderately strong test.	Large amount.	Very slight.	1.25	.31¼	.12½	7.000
10	Fine, grayish white powder.	1–3000	1–1500	Very milky, consid. insol. matter.	Tolerably fair.	Fairly pleasant.	"	Moderately strong test.	Considerable.	Very slight.	.55	.27½	.25	.600
11	Pale, yellow, transparent scales.	1–3000	1–2250	Very milky, no residue.	Fair when fresh, putrid when exp'd short time	Unpleasant, mucous.	"	Moderately strong test.	None, milky.	Very hygroscopic, gummy.	.55	.41¼	.37½	.380
12	Broken, thick, yellow scales, somewhat granular.	None.¶	1–100	Very milky, large am't of insol. matter.	Putrid, "piggy."	Bitter, repulsive.	"	Sl. test.	Large amount.	Considerable.	.40	.01⅓¶	.01⅔¶	11.500¶
13	Yellowish-white powder.	1–3000	1–500	Exceedingly insolubl .	Unpleasant, aromatic.	Sl. bitter, sugary.	"	Sl. test, heavy precipitate.	Almost entir'ly insoluble.	None.	1.25	.20⅝	.08⅓	7.000
14	Thin scales, brownish-metallic color.	1–3000	1–1375	Nearly clear sol., consid. residue.	Rather putrid and "piggy."	Fairly pleasant.	"	Moderately strong test.	Consid., nearly clear sol.	Very slight.	.45	.26 1/10	.22½	.482
15	Granular, yellowish-white powder.	1–3000	1–1650	Almost clear sol., lit. or no residue.	Somewhat putrid	Unpleasant, mucous.	"	No test.	None.	Very hygroscopic, gummy.	.52	.28⅜	.27½	.445

* Calculated on 1–9000 strength. The claim on the label stating that it "is 20 to 40 times the strength of saccharated pepsins."
† Calculated on 1–3000 strength. ‡ Calculated on 1–3000 strength. The claim on the label being "Standard Test."
¶ No claim being made on the label, calculations were based upon 1–3000 strength.

No. 2 claims on the label that it is "20 to 40 times the strength of the saccharated pepsins." Since saccharated pepsin is 1–300, and calculated upon this basis, No. 2 would possess an average digestive power of 1–9000. Comparative calculations were, therefore, based upon that average.

No. 7 is claimed to be "unequalled in digestive power, dissolving 2000 or more times its weight of coagulated albumen in four to six hours." Accepting this claim as possibly meaning a full United States Pharmacopœia strength, comparative calculations were made accordingly.

No. 8 claims to be a "pure pepsin, standard test." It was, therefore, accepted as a 1–3000 pepsin.

No. 9 claimed to be 1–2000, but the fact that it is one of the highest priced pepsins was an inducement to include it in the list.

No claim is made on the label of No. 12, but its low digestive power, 1–100, was sufficient reason for including it.

It seems strange that the market should be flooded with so many pepsins of such varying strengths, when the manufacturers of these products publish the statement that their respective pepsins are up to the 1890 pharmacopœial requirements, unless they are not standardized according to the United States Pharmacopœia test, otherwise there would seem to be evident proclivities to duplicity, for any individual who is reasonably exact in pharmaceutical and assay manipulations, could scarcely deviate more than 100 to 200 or 300 grains either way, in determining the amount of albumen a so-called 1–3000 pepsin will digest. We are, therefore, forced to the conclusion that some of these manufacturers and dealers employ methods of their own for standardizing their pepsin, and that such methods are so adjusted as to favor their pepsins. There may be an object on the part of some of these parties in modifying the United States Pharmacopœia method of assaying, whereby they make their pepsin apparently to digest 1–3000, yet if submitted to the United States Pharmacopœia test, the same pepsin will probably not digest more than 60 or 75 per cent. of the proper amount. Again, it is not stated on the label of some of these pepsins, whether they are 1–3000 according to the United States Pharmacopœia 1890 test, or simply United States Pharmacopœia 1890, leaving the inference in the latter case that the United States Pharmacopœia test has been employed; and if perchance some chemist or pharmacist should submit this pepsin to a careful United States Pharmacopœia test, and find that it was not up to that standard, and should write the manufacturers or dealers accordingly, the reply is that their pepsin is a strong 1–3000 according to the test which they employ and which they claim to be preferable to the United States Pharmacopœia test, by reason of its greater simplicity and less probabilities of errors being introduced. Granting this to be true, since we do not claim perfection for the official test, yet the position is unfair, and should not under any circumstances be accepted; for if it were, an un-

limited number of modifications of the United States Pharmacopœia test to suit the judgment of the dealer would be the result. This seems to be the condition of things to-day, since we have upon the market a great variety of pepsins claiming to be 1–3000, yet a majority of them are inferior when submitted to the United States Pharmacopœia test. We cannot assert that this is a direct attempt at deceit, but it savors very much of such an inclination.

It is fairly well known that the United States Pharmacopœia test is modified in two essential particulars by some assayists. One of these modifications consists in keeping up a constant agitation by means of an automatically arranged agitator. Another is a deviation in the method of preparing the albumen by transferring the albumen, which has been passed through the sieve to a mortar, and triturating until a soft magma is formed. Either of these deviations will cause a pepsin to appear much stronger than when submitted to the United States Pharmacopœia test. Of the same batch of albumen, when divided into two equal parts, the part which has been triturated in a mortar to a soft magma will be digested in about two-thirds of the time required for the part which has not been so triturated. It is also an easy experiment to demonstrate that an automatic agitator which keeps the preparation in constant circulation will greatly lessen the time required for complete digestion. While both of these, as well as many others, some of which are commendable modifications, are employed by some, yet they are not in conformity with the United States Pharmacopœia test, and are, therefore, misleading and deceptive. The more thorough division of the albumen by means of triturating in the mortar is to be condemned, for the reason that the same albumen if taken into the stomach as food would not be so thoroughly disintegrated during mastication ; and the object of the committee in submitting a practical test, was evidently to make it conform as nearly as possible to natural conditions. Evidently the reason why constant agitation is not directed in the United States Pharmacopœia test is because a large majority of pharmacists have not the means of applying that part of the test. The design of the committee, therefore, was to make all the conditions sufficiently simple for any retail pharmacist or physician to apply the test without the use of steam, water, or electrical power. Therefore, these modifications, or any others, which materially favor the digestion, are manifestly unfair, and if a drug or pharmaceutical preparation which does not conform to the United States Pharmacopœia requirement, or is inferior in any particular, can be called sophisticated or adulterated in the meaning of the enactments of some States, then these weak pepsins obviously fall within this category, and steps should be taken to educate the physician and pharmacist accordingly.

Another reason for these so-called 1–3000 pepsins being foisted upon the market, is through pecuniary or mercenary motives, since a pepsin which

assays but 1,500 to 2,000 by the United States Pharmacopœia test, can be manufactured and sold at one-half to two-thirds of a true 1–3000 article.

In external or physical appearance of the various samples of pepsin there is a great diversity. A majority, however, conform reasonably close to the United States Pharmacopœia description. But the fact that in physical appearance it tallies with the very broad official description does not preclude the possibilities or probabilities of sophistication as noted a little further on. In regard to the actual strength of some of these pepsins, it remains with each individual to decide whether the inferiority is due to ignorance of the facts, or something else. It is true that some few are not claimed to be up to the United States Pharmacopœia standard, but they are said to be pure pepsins, and marketed at prices in most cases above those of good 1–3000 article. For instance, one sample, claimed to be pure, assays 1–75, and is listed at 60¢ per ounce, net. Another assaying 1–500 is listed at $1.25 net, and still another, claimed to be 1–3000, assaying 1–500 is listed at $1.25 net. It will be seen from the above table that the first of these should sell at ½¢ per ounce, the second at 12½¢, and the third at 8⅓¢. Based on a 1–3000 strength, No. 12 should sell at 1⅔¢ per ounce. There is manifestly something wrong about such business, not only from a financial point of view, but from a therapeutic standpoint. If there be any medicinal value to pepsin, the physician who uses the 1–75, 1–100, or 1–500 pepsin will certainly not obtain the results for which he seeks with his patient. If he fails, he will attribute his failure to some idiosyncrasy of his patient, not knowing that his diagnosis and treatment are correct, and that his medicine is practically a worthless article.

With the exception of three or four samples, the pepsins all conform to the United States Pharmacopœia requirements for solubility, Nos. 5 and 15 showing the clearest solution and least amount of residue.

Very few of the pepsins possess the pleasant, agreeable odor and taste, characteristic of a first-class pepsin.

A notable feature of some of the samples was the very hygroscopic property. An equal weight of each sample was exposed to the air of the room at a temperature of about 75° to 80° F. for 12 hours. The observations in column 2 were made at the end of that time. The pepsins which did not show a hygroscopic tendency at the end of 12 hours, were then allowed to stand for several days, and still did not possess any of that objectionable feature, thus showing that a good, non-hygroscopic pepsin can be made.

Returning to the actual strengths of the pepsins, we think a brief comment is appropriate. The United States Pharmacopœia states that at the expiration of the six hours digestion, the albumen should have disappeared, leaving at most only a few thin, insoluble flakes. Here is where difference of opinion will arise, some claiming that the albumen is wholly digested, while others could not so pass upon it. As a control in this matter, a

pepsin which digested all the albumen, leaving very few, or no flakes, and giving a perfectly clear water-like solution, was used as a check, or standard; but the end results with those which assayed less than 1–3000 were not required to correspond exactly with the standard, thus allowing in the judgment of the operators all the margin possible in favor of the several pepsins.

Samples Nos. 2 and 13 contain considerable sugar, which estimated quantitively with Fehling's solution gave about 40 and 50 per cent. respectively. Further work will be done on these two samples with a view of ascertaining what other diluents, if any, have been added. After making allowance for the amount of sugar found, these two pepsins should assay 1–1200 and 1–1500, yet No. 2 is but $\frac{1}{2\frac{1}{2}}$ of that strength, while No. 13 is about $\frac{1}{3}$, thus indicating the probable presence of some other diluent, especially with No. 2, since it is quite soluble.

In conclusion, we would say that the question, "Do the pepsins of the market conform to the United States Pharmacopæia standard?" was a very pertinent one, and in our efforts to give an intelligent reply to it, we have learned that in a large majority of cases, it must be answered in the negative, with a very big N.

(a) To find the price which should be asked for a pepsin based upon its actual strength, compared with the strength claimed and the net price:

The strength claimed is to the net price as the actual strength is to x.

For an example, take No. 1.

The strength claimed is 1–3000.

The actual strength is 1–2350.

The net price is 75¢ per oz.

Therefore, 3000 : 75¢ :: 2350 : x=58 ¾¢, the price which should be asked based upon the actual strength.

(b) To find the price which should be asked for a certain pepsin based upon the net price and the actual strength of another given pepsin, used as a standard:

The actual strength of the given pepsin, used as a standard, is to its net price as the actual strength of the other pepsin is to x.

For an example, compare No. 5 and No. 10.

The actual strength of No. 5 is 1–3000.

Its net price, 50¢ per oz.

The actual strength of No. 10 is 1–1500.

Therefore, 3000 : 50¢ :: 1500 : x = 25¢, the price which should be asked for No. 10 pepsin based upon the actual strength and net price of No. 5.

(c) To find the amount saved on each ounce by reason of buying a true 1–3000 pepsin at 50c. per oz.

Compare the actual strength and market price with a 50c. pepsin, assaying 1–3000.

For an example, take No. 5 and No. 10.

The actual strength of No. 5 is 1–3000.

Its market price is 50c.

The actual strength of No. 10 is 1–1500.

Its market price is 55c.

Therefore, 3000 ÷ 1500 × .55 — 50 = 60c., the amount saved on one ounce.

To obtain the same digestive results requires twice as much of No. 10 as of No. 5; hence two ounces would cost $1.10, thus making a difference of 60c. in favor of No. 5. This comparison is intended to show the saving, provided the pepsins were prescribed or used pharmaceutically, in quantities bearing a correct ratio to the actual strength. As a matter of fact, this is not the case; for the physician or pharmacist employs the same amount for a particular purpose whatever the brand or pepsin may be, or whether the strength is 1–3000 or 1–100.

MR. SAYRE: Notwithstanding the remark that was made here this morning, I feel very much like the author that wrote a book and said after it was written he loathed the very sight of it. I believe a good many of us who have gone over this ground loathe the very sight of any article on this subject, and I do not wonder that our friend made such a remark, to which I reply, I stand here in defense of a man who would come before this Association and read such a paper in the face of such a remark. I want to say there is something new on the subject, and here we have the principles of pepsin reduced to an exact ratio. We can figure it out right away, therefore—as 3,000 is to 75 so is 2500 to x. That reduces this to a mathematical calculation. There is one other point I want to make in regard to this paper. Some of these pepsins, while apparently wholly dissolved, are yet not so. A student will come to you and say, "I have a half a dozen pepsins; they are all dissolved." "Sure?" "Yes, sir, every one of them, all dissolved." "Let me see them?" He will bring the solutions to me. "Do you call these equally strong?" "Yes, sir, that is all right." "But no, there is a difference." "What is the difference?" "There are in one some flocculi, in another more flocculi, in another less flocculi," and so on. In order to make this more uniform, in order to make this exact, why, it will require in the case of the opaque solution almost double the pepsin to do it. Why is that? The Pharmacopœia takes no recognition of that fact and I do not suppose it can, there are so many conditions that will vary the test of pepsin. We have not a test that is absolutely reliable, and I do not know that we can have.

MR. HALLBERG: I can answer the gentleman: we never will, because we know pepsin is a ferment. There is no limit to its fermenting power, and hence the absurdity in measuring in cold figures, in dollars and cents, the digestive value of pepsin. If pepsin produces fermentation, there is no limit to its fermenting power, and it simply resolves itself into the question to what extent can we govern the physical conditions so as to enable it to continue its fermentative power; to what extent can we present a sufficient exposed surface of the albumen for the ferment to work on. I am satisfied with one grade of pepsin we could digest 300 grains of albumen, as we did ten or twenty years ago. Take it now, we have 3,000; take it five years from now, 30,000; and take the Pharmacopœia of 1910, perhaps 300,000. It resolves itself into the question, how can

we remove the peptone, in order to present a new surface for the ferment to work on? That is the reason we never will have any test. Pepsin is only good as a pharmacopœial agent. We do not know what particular action we are going to have, and for that reason it is only useful as a pharmacopœial agent to produce peptones. That is its only legitimate use, and nearly every prominent physician is coming to that conclusion.

Mr. Sayre: I would like to ask does the gentleman mean that one grain of pepsin of which he speaks—the pepsin made to-day—will dissolve 300,000 grains of albumen?

Mr. Hallberg: That is what he meant to say, for not knowing about the action of the ferment that certainly would be a theory. It is only a question of how far we can carry it out. I want to say since Dr. Eccles read his paper at Old Point Comfort, in 1890, which took him, I believe, three hours at that time, he showed that the pepsin ferment was active up to the point of 130° or 135° Fahrenheit; since that time, inasmuch as it was desirable to test the quality of pepsin, we have adopted the method of the Pharmacopœia, but we raised the temperature. We can get the pepsin to work under those conditions, excepting the elevation of the temperature, in fifteen minutes. What the pharmacist wants is a method by which he can determine the comparative value of pepsin in a reasonable time. A pharmacist cannot take five hours off to determine the strength of every specimen of pepsin he buys. It is a comparative test, and the fact that it is conducted at 135 instead of 100 doesn't cut any figure. It is simply a comparison, and therefore, I think, in the new Pharmacopœia we should endeavor to get a common test for the determination of the strength of pepsin if we are going to still keep it in the Pharmacopœia, and all of this detail about how the egg-white should be boiled is unnecessary. The best method for coagulating the egg-white is by simply dropping it into the water, then boiling, stirring it continually until the water is brought to a boil, with one of these centrifugal egg-beaters; then have it evenly divided and suspended in a dish, and by simply weighing out the egg-white before you add the water, you know just how much you have.

Mr. Beal: I wish to reply in part to what Mr. Hallberg has said in regard to the digestive power of pepsin. Mr. Hallberg is not restricted in his remarks to the limitation of the pharmacopœial test. It is true, pepsin under certain conditions is capable of digesting an almost unlimited amount of albumen; but Mr. Sherrard, in his paper, has dwelt upon the pharmacopœial test, and by that test we are enabled to determine the value of pepsin, its activity.

In Mr. Sherrard's preliminary remarks I wish to call attention to one point in regard to the higher grade of pepsin. Now there is no question but what the medical profession appreciate pepsin to-day more highly than ever heretofore, and the reason is that we have better pepsin. In one decade we have advanced the pharmacopœial standard from 1–50 to 1–3000 and more, because it was the intention of the Pharmacopœia to make it 1–3000 and to encourage manufacturers to make higher grades of official pepsin—and by official pepsin I mean that pepsin that will conform to the pharmacopœial test. If your albumen disappears at four hours or five hours, it indicates a stronger pepsin, but it certainly does not show that it is an ideal pepsin. Therefore, there is no limit placed upon the maximum power of pepsin by the Pharmacopœia; the minimum, however, is 1 to 3000. The sample marked No. 2 of this table is said to be, "Fine white powder with yellowish tint, of 20 to 40 times the strength of saccharated pepsin." Now, such is not the case. This is probably what he means; he refers to the old standard of the 1880 Pharmacopœia, and 20 to 40 times that standard of pepsin which is very commonly sold to-day, and yet it is a year and a half since the Pharmacopœia was issued.

Dr. Whelpley: The speaker just stated that the medical profession of to-day so fully

appreciated pepsin, and I would like to agree with him thus far, but add that they appreciate that it is of no value as a medicinal agent in a large number of cases in which it is administered. And one reason for this is the very fact that it is a ferment, and like all ferments, depends on certain conditions before it can operate. As an example, a patient might have conditions under which we formerly administered pepsin. There was already pepsin in the digestive organs, but the conditions were not favorable for that pepsin to act. Now, the administration of more pepsin simply made a bad matter worse.

MR. HALLBERG: When I was first introduced into the practical experience of pharmacy I remember we had a pepsin made of ———, or some one of the earlier pepsins, that was of very little value, very low digestive power. It was then that it gained its reputation, and it was then that a dose was half a grain or a grain; when we had pepsins, that were said to have ten times that power, the dose was increased to one or two grains; when we had pepsins of fifty times that power the dose was increased to ten grains; and now that we have pepsins 1 to 3000, it takes half a pound for a dose. (Laughter.)

Upon motion Mr. Sherrard's paper was referred to the Committee on Publication, and the following paper was presented to the Association, and in the absence of the author was read in abstract by Dr. Bartley, and upon motion referred to the Publication Committee.

ON THE CHEMICAL COMPOSITION OF THE VOLATILE OIL FROM MONARDA FISTULOSA, LINNÉ.

BY EDWARD KREMERS.

The term horsemint is applied to the genus Monarda as well as more specifically to the one species M. punctata, whereas the species M. fistulosa is commonly known as wild bergamot. It appears that the oil from the former alone has been examined thus far.

An oil of horsemint supposed to be derived from Monarda punctata was examined by Arppé* in 1846. The crystalline stearopten, evidently thymol, was separated mechanically from the liquid portion designated eleopten, without, however, ascertaining anything very definite about its chemical composition.

In 1888 an examination of oils, also supposed to be obtained from Monarda punctata, was made by Mr. Schroeter.† One sample of oil was taken from the cabinet of the Philadelphia College of Pharmacy, where it had been standing for six years, during which time it had deposited crystals of thymol. The other two specimens were evidently obtained in the open market from reliable sources. However, for none of the four specimens of oil heretofore examined is any positive guarantee given as to the source of the oils. The significance of this doubt will become apparent later.

The conclusion Mr. S. arrives at is that the oil contains a hydrocarbon of the formula $C_{10}H_{16}$, of which, however, he made no characteristic deriv-

* Annalen d. Chem. & Pharm. 58, 41.

† Am. Journ. Pharm. 1888, p. 113.

ative; thymol, "which is dextrogyrate;" a compound $C_{10}H_{18}O$, boiling between 240°–250°C.; and formic, acetic and butyric acids. The methods according to which some of these compounds were obtained, as well as the properties of some of them, *e. g.*, the rotatory power of the thymol, the low congealing point of the same (indicating carvacrol rather than thymol), attracted the attention of the writer of this paper some years ago.

Since Monarda fistulosa grows abundantly around Madison, the temptation to learn something more about the oils from various species of Monarda gave rise to investigations which were begun a year ago, and which are still in progress. The results obtained thus far have proven of sufficient interest to warrant the publication of the same at the present time, though the investigation is by no means concluded.

The flowering plant of Monarda fistulosa* was collected near Madison, in August, 1894. The plant was deprived in large part of the stems, because these were found to be almost devoid of volatile oil. In part, the plant was distilled in the fresh condition with water vapor; in larger part, however, it had to be dried before distillation. In all, 683 grams of oil were obtained. Some of the oil was of a light reddish color, while other portions were dark red, or even brown. This color is due to a crystalline substance to be described later.

The specific gravity of the mixed oil was found to be 0.941 at 20° C. On account of the dark color the rotatory power could not be determined. Upon redistillation the color did not appear to diminish, although the specific gravity was lowered to 0.940 at 20° and a slight resinous residue remained.

SEPARATION OF PHENOLS.

In part the oil was shaken with an excess of soda solution of about 20 per cent strength; in larger part, however, with 5 per cent. potash solution. The aqueous solution of phenolates was separated from the remaining oil by means of a separating funnel, and the phenols regenerated by the addition of an acid and distilled with water vapor.

CARVACROL.

The phenols thus separated from a quantity of the oil upon distillation passed over largely between 229–230.8° C. (corr. 234.2–236). This fraction, being subjected to the temperature of an ether bath containing solid carbon dioxide at about —40° C. solidified to an amorphous transparent mass, remaining apparently unchanged at temperature as low as —100° C. Upon rise of temperature from about —40° to about —20° a distinct formation of crystals took place, which melted at about —0.5 to a light yellow liquid. Its density at 20° C. was 0.9770. It was optically inactive, R = 0.31292, N. = 1.52344.

*The plant was identified by Mr. L. S. Cheney, instructor of pharmaceutical botany at the Univ. of Wis.

Upon addition of a neutral solution of ferric chloride to the aqueous solution of the phenol a green color immediately appears. In a few minutes the solution becomes turbid and upon standing deposits white filamentous crystals of dicarvacrol which melt at 147–148° C. Upon recrystallization from dilute alcohol they melted at 154–155°. The isomeric dithymol obtained in like manner melted at 164–165° C.

The phenol when mixed with three times its weight of concentrated sulphuric acid (specific gravity 1.8) forms a pink crystalline solid. Upon recrystallization from a small quantity of water prismatic crystals of carvacrol sulphuric acid were obtained, which, washed with a few drops of water and dried, melted at 58–59° C. Thymol sulphuric acid obtained in a similar manner melted at 114–115° before and at 116–117° after recrystallization. Specimens of carvacrol sulphuric acid obtained from commercial carvacrol melted at 59°, 58° and 57° respectively.

A few light-yellow acicular crystals of nitro-carvacrol were obtained by the action of nitrous acid from sodium nitrite upon an aqueous alkaline solution of the phenol. Upon heating the bath gradually the crystals melted at 152–153° with decomposition. When plunged into the heated bath they melted at 153–154°, decomposing immediately. Thymol treated in a similar manner yielded crystals melting at 130°.

Dinitro-carvacrol was obtained from the sulphuric acid. To a dilute solution of this acid sufficient nitric acid (specific gravity 1.4) is added to produce a yellow tint. Upon standing, crystals were formed which melted at 114–115°. Upon recrystallization from hot petroleum ether the melting point rose to 117–119°. The dinitro compound prepared from commercial carvacrol melted at 117–118°. A nitrogen determination gave at 20° and under 729 Mm. pressure 30.3 Cc. of gas from 0.2626 grams substance, corresponding to 0.033116 gram or 12.61 per cent. nitrogen. The formula $C_{10}H_{11}(OH)(NO_2)_2$ requires 11.6 per cent. nitrogen.

Dinitro-thymol prepared from commercial thymol after recrystallization melted at 55–56° C. 0.2246 Gram substance yielded 24.2 Cc. gas at 21° and under a pressure of 737 Mm., corresponding to 0.02724 gram or 12.18 per cent. nitrogen.

Upon the addition of bromine diluted with glacial acetic acid, to the phenol dissolved in the same acid, only amorphous products were obtained, which decomposed. Thymol, on the other hand, when treated in a like manner yielded a colorless solid, which, after recrystallization from petroleum ether, melted at 51° C.

RED COLORING MATTER.

While distilling with water vapor a comparatively small quantity of phenols liberated from the aqueous solution by means of an acid, red crystals separated in the condenser and were collected separately. The appearance of these crystals, as well as their behavior toward the alkalies, suggested alizarin or a substance related to the same. The crude crystals

melted at 219–223° C. After sublimation between watch-glasses the prismatic crystals of a deep scarlet color melted at 256–266°, while at the same time a specimen of commercial alizarin melted at 276–278°. There appears not only to be a difference of opinion with regard to the melting point of alizarin, but it is also difficult to observe, on account of the readiness with which the substance sublimes. A special study of this coloring matter will be made in the near future.

NON-PHENOL CONSTITUENTS OF THE OIL.

The oil, which had been deprived of the phenols in the manner before described, was distilled from an alkaline solution with water vapor, the distillate being collected in two fractions. The first was slightly yellowish, while the second was of a reddish color. The first fraction from the distillation with water vapor possessed a fragrant odor, a specific gravity of 0.865, and in a 100 Mm. tube turned the plane of polarized light 0.966 to the left, hence $(\alpha)_D$ −1.1167. This oil was fractionated and the specific gravity and rotatory power of the fractions were determined as far as possible.

Fractions.	B. P.	Yield.	Sp. Gr. at 20.	α for 100 Mm. tube.	$(\alpha)_D$
1	160–165	10 C.c.			
2	165–169	51 "	—0.847	—3.5716	—2.4596
3	169–172	48 "	0.849	—2.0833	—0.2447
4	172–174	9 "	0.854	—0.2100	—0.7532
5	174–176	15 "		—0.6433	
6	176–178	3 "		—0.5456	
7	178–180	2 "			
8	180–184	4 "		—1.1783	
9	184–188	5 "			
10	188–192	1 "			
11	192–200	1 "			
12	200 + res.	20 "			

With the exception of the last fraction (the residue) which had a slightly reddish color, the several fractions were nearly colorless.

Fraction distilling at 165–169° C. being the largest, was refractionated, two fractions being collected. The residue was added to the previous residue. The fractions with their specific gravities and rotatory powers were as follows:

B. P.	Yield.	Specific Gravity at 20°.	α for 100 Mm. tube.	$(\alpha)_D$
—167	26 C.c.	0.843	—2.8575	—3.3837
167–172	24 C.c.	0.845	—1.1008	—1.3027

Both of the fragments were nearly colorless, with a fragrant odor.

The several fractions of both fractionations, as well as the second fraction distilled from the alkaline solution, were exposed to a freezing mixture for 24 hours, but no separation, crystallization or solidification took place.

FRACTION AT 167° C.

Upon combustion the fraction —167 of the refractionated portion gave the following results:

I. 0.2332g. of the substance gave 0.2526g.H_2O – 0.02806g.H and 0.7354g.CO_2 – 0.20056g.C.

II. 0.2497g. of the substance gave 0.2692g.H_2O – 0.02991g.H and 0.7848g.CO_2 – 0.21403g.C.

Calculated for		Found.	
$C_{10}H_{14}$	$C_{10}H_{16}$	I.	II.
C – 89.55 per cent.	88.23 per cent.	86.00 per cent.	86.35 per cent.
H – 10.45 per cent.	11.77 per cent.	11.03 per cent.	11.97 per cent.

FRACTION AT 172–174° C.

Upon combustion, fraction 172–174 gave the following results:

I. 0.3842g. of the substance gave 0.3903g.H_2O – 0.04336g.H and 1.2466g. CO_2 – 0.33995g.C.

II. 0.2093g. of the substance gave 0.2101g.H_2O – 0.02334g.H and 0.6651g. CO_2 – 0.18155g. C.

Calculated for		Found.	
$C_{10}H_{14}$	$C_{10}H_{16}$	I.	II.
C – 89.55 per cent.	88.23 per cent.	88.48 per cent.	86.74 per cent.
H – 10.45 per cent.	11.77 per cent.	11.02 per cent.	11.15 per cent.

This fraction was tested for limonene and phellandrene by Wallach's methods; but negative results were obtained. Duplicate tests were made with these substances (limonene and phellandrene) derived from other sources.

SAPONIFICATION OF FRACTIONS.

Fractions 160–165° and 200° + (residue) were each boiled for an hour with an alcoholic solution of potash. It was found that in the saponification of fraction 160–165°, which contained 7.6050 grams of substance, 0.1149 grams of potassium hydrate were consumed; while in the case of fraction 200+ no appreciable amount of potassium hydrate was consumed.

The oil of both fractions was recovered by distilling with vapor, after which that of fraction 200+ was refractionated, three fractions being collected as follows:

1) from 215 – 225.
2) " 225 – 235.
3) " 235 +

FRACTION AT 225 – 235° C.

Upon combustion, fraction 225 – 235 of the refractionated residue gave the following results:

0.2694g of the substance gave 0.2542g.H_2O – 0.02824g.H and 0.7896g.CO_2 – 0.21534g.C.

Calculated for $C_{10}H_{16}O$	Calculated for $C_{10}H_{16}O$	Found.
C – 78.94– per cent.	77.92– per cent.	79.93 per cent.
H – 10.52– per cent.	11.68– per cent.	10.48 per cent.
O – 10.52– per cent.	10.38– per cent.	9.59 per cent.

OXIDATION WITH CHROMIC ACID.

With the exception of the refractionated residue, the several fractions were mixed, making in all 118 C.c. This was shaken with Beckmann's reagent (which is a solution of 60 parts potassium dichromate, 50 parts sulphuric acid, and 325 parts by weight of water) when a portion of the oil was oxidized, forming an insoluble compound, which was separated by means of a separating funnel. The residue was made alkaline and distilled with water vapor. The oil thus recovered, which measured 78 C.c., was nearly colorless, and possessed a fragrant odor. It had a specific gravity of 0.8520 and a rotatory of +0.5592, hence $(\alpha)_D$+0.8563.

OXIDATION WITH POTASSIUM PERMANGANATE.

Inasmuch as the portion of the oil not affected by Beckmann's reagent resembled cymene in odor, color, specific gravity, boiling point, and in its action toward the above-mentioned Beckmann's reagent, a test for the same was made. Five C.c. of the oil were shaken with a solution of 30 grams of potassium permanganate in 825 grams of water and heated on a water bath until the solution became colorless, after which it was filtered and the filtrate evaporated to dryness.

The residue thus obtained was digested with absolute alcohol. After filtering the alcoholic solution, the filtrate was evaporated nearly to dryness and a small quantity of water added. Upon acidulating this solution with a 50 per cent. solution of sulphuric acid, abundant precipitation of oxycumic acid took place. The precipitate was washed and recrystallized from alcohol, and found to have a melting point of 156° C. A duplicate test was made with cymene derived from another source, and with the exception of the melting point of the acid formed, which varied a few degrees, the results obtained were identical with those of the first test.

If the oils examined by previous investigators had been positively derived from Monarda punctata, one might be inclined to suppose that the two species punctata and fistulosa produced two isomeric yet chemically distinct phenols, viz: thymol and carvacrol. Under the conditions such a conclusion would be unwarranted at present—this all the more so, if one

recalls the observations made in the laboratories of Schimmel & Co., that e. g. oil of thyme sometimes contains thymol, sometimes carvacrol, or both. This question of plant-physiological interest can therefore be answered only after a longer and careful study of the oils of both species of Monarda. Material for this purpose is already being collected.

The question whether the two species of Monarda produce either thymol or carvacrol is also of commercial importance, since the present source for carvacrol is limited and not always reliable.

The isolation of a crystalline coloring matter, evidently with phenol characteristics, from a volatile oil, is also of chemical and plant-physiological interest. The study of this substance may assist materially in throwing light on the coloring matters of other volatile oils. It may interest the plant physiologist to know that thus far no red oils have been obtained this year, though the plants were collected from the same localities and at different times. Whether the extremely dry weather has affected the coloring matter of the plant, as it affected its growth in general, is a question that cannot yet be answered.

Attention should finally be called to the resemblance in chemical composition between the oil of Monarda fistulosa and of the Origanum oil recently examined by Dr. Gildemeister* of Leipzig.

Mr. J. L. Mead and Mr. J. J. Brennan I desire to thank for their assistance in carrying out the experimental work of the investigation as far as reported in this paper.

Madison, Wis., August, 1895.

THE CHAIRMAN: We will next listen to some papers by several students of the University of Kansas School of Pharmacy, presented by Prof. Sayre.

MR. SAYRE: I would like to bring up the matter of papers presented by the University of Kansas, and I would move that these papers be received by this Association and referred back to the authors for revision. These papers have been written and the titles are, "The Digestive Power of the Spleen," "The Coffee Bean," and "A Comparison of Cucurbita Foetidissima and Ipomoea Leptophylla." They are presented in the names of the authors, students of the University, and, if you will allow me, I will take them home and arrange them in such a way that they can be printed in our reports. I would like to submit them to the Publication Committee, and I return them for that purpose; and if it is satisfactory to the Publication Committee, I should like to have an opportunity to prepare them for the report, so that you could read them and not be tired by hearing them read this afternoon.

At the suggestion of Mr. Remington, the papers referred to were read by titles only, and referred to the Committee on Publication.

The Chairman suggested that, in order to save time, the three papers prepared by himself be also read by title and referred to the Committee on Publication; but Mr. Remington objected to the papers being passed over in that manner, and, upon motion of Mr. Lloyd, the reading of the

* Archiv. d. Pharm. 233, 182.

papers prepared by Dr. Dohme was made a special order for the first business of the evening session.

Prior to the adjournment of the Section Mr. Crona, of Lyons, Colorado, exhibited to the Section interesting specimens of forest rock, and explained the supposed formation of the designs on the surface from the action of frost and rain.

The Section thereupon adjourned until 8:30 p. m.

THIRD SESSION—SATURDAY EVENING, AUGUST 17, 1895.

Chairman Dohme called the Section to order, and after the reading of the minutes of the previous session, which were approved as read, under the motion of Mr. Ryan at the previous session, the papers prepared by Dr. Dohme were read, the first being,

THE ASSAY OF ERGOT.

BY ALFRED R. L. DOHME.

QUERY 17. Give the relative alkaloidal value, *i. e.*, percentage of the cornutine of Keller, of Spanish, German and Russian ergot.

Ergot has been used for centuries, but up to this year no recognized method of assay has been proposed for it, although it does contain alkaloids besides many other constituents. The controversy as to what is the active principle of ergot is of long standing, and to-day there are those who maintain that ergotinine (Tanret) is the active principle, while others maintain equally firmly that sclerotic acid (Dragendorff) is alone active, and others again are of the opinion that what they term cornutine and sphacelinic acid (Kobert) are responsible for ergot's physiological action. Ergotine is the name given to an extract of ergot (freed from albumen and mucus by means of alcohol) by a French pharmacist, Bonjean, in Chambéry, in 1842. This is unfortunate, as this name, which should be the one given to the alkaloid of ergot, is thus applied to an extract which contains very many substances. The following substances have been isolated from ergot, and will give a good idea of its complexity: Formic acid, a camphor, cholesterin, choline, cornutine, ecboline, albuminoids, ergosterin, ergotinine, ergotinic acid, fats, fatty acids, fuscosclerotic acid, resin, yellow coloring matter, leucine, mannite, lactic acid, mycose or ergot sugar, phosphates, picrosclerotine, mucus, sclererythrin (the coloring matter of the membranous covering of ergot) scleroiodin and sclerocrystallin, sclero-mucin, sclerotic acid, scleroxanthin, sphacelinic acid and vernine.

Many of these, no doubt, are impure forms of others, and the number will, no doubt, some day be greatly reduced. Still, the fact remains that ergot is a very complex drug, and its assay, hence, very difficult. As in case of all drugs, an assay is not of much value until we know just what is the active principle or principles of the drug, and cannot be easily effected

until we know exactly the properties of all the constituents. Keller has devised a method of assay for ergot, and has obtained as a result a substance which he calls cornutine, and which he claims is an alkaloid, and is the active principle of the drug. He has prepared salts of it, but he has not yet obtained it in quantities sufficient to warrant chemical examination and an analysis. This, he states in his paper, he will leave for others to work out. The author is undertaking this work, and hopes soon to be able to report upon it. For the present, all that can be published are the assays of the various kinds of ergot obtainable in this market, by the method of Keller; assuming that the semi-crystalline residue which is thus obtained, and which dissolves in acids, is a homogeneous substance. Keller's method of assay is given below. Ergot in powder, 25 grammes. Percolate with petroleum ether until a drop no longer leaves a residue on evaporation. Dry and put into a flask, and add 100 grammes ether. Then add milk of magnesia (1.0 gramme MgO to 20 C.c. H_2O). Shake well, when the ergot balls together, and continue shaking for half an hour. Pour off 80 grammes ethereal solution, or an aliquot part (4 grammes representing 1 gramme ergot). If not clear, let stand several hours and filter. Shake out with 0.5 per cent. hydrochloric acid solution in three portions of 25, 15 and 10 C.c. respectively, until Mayer's solution no longer gives a precipitate. If the acid solution is flocculent, filter after adding some powdered talcum. Shake out acid solutions with an equal amount of ether after adding ammonia in excess. Repeat three times and distil ether from tared flask.*

By applying this method of assay to samples of Spanish, German and Russian ergot obtained in New York, the following results were obtained:

German ergot—(*a*)	0.15	per cent.	cornutine	of Keller	
(*b*)	0.14	"	"	"	mean 0.15 per cent.
(*c*)	0.15	"	"	"	
Spanish ergot—(*a*)	0.29	"	"	"	
(*b*)	0.28	"	"	"	mean 0.29 per cent.
(*c*)	0.29	"	"	"	
Russian ergot—(*a*)	0.18	"	"	"	
(*b*)	0.19	"	"	"	mean 0.18 per cent.
(*c*)	0.17	"	"	"	

Until we know more of this cornutine of Keller, the best we can say is that Spanish ergot is more valuable than Russian ergot and this more valuable than German ergot. Keller has made the interesting observation that ergot by aging becomes weaker in cornutine, or in other words loses its strength; for a sample of German ergot which he assayed and which he knew to be several years old, he found to contain considerably less cornutine than fresher ergot which he assayed. Should subsequent work

* The cornutine can be obtained in crystals if the ethereal solution is allowed to evaporate spontaneously and slowly.

show that Keller's cornutine is the active principle of ergot, and that his method extracts all of this substance from the drug, then the above results may become of value; as it is, they can merely be regarded as indications and possess interest rather than value.

Baltimore, July 24, 1895.

Upon motion of Mr. Lloyd this paper was received and referred to the Publication Committee.

MR. HALLBERG: I see that Dr. Dohme has not referred to the ergotine of Wiggers here, and I think it would be well to call the attention of the Section to the distinction between Wiggers' and Bonjean's Ergotine. I think that we all realize the fact that we do not know anything about that, and yet it is doubtful what value a method of assay of this drug can have in the determination of principles which, so far, have not been shown to represent the medicinal value of ergot. In this connection, I think that the process of the fluid extract would be improved if the alcoholic percentage were somewhat reduced. I think if the alcoholic percentage were reduced, the fixed oil would not be extracted to the extent that it is. We would have a preparation freer from the fixed oil, which is objectionable. Also, a preparation more fully representing the value, which, no doubt would be a gain to the practitioners that use ergot largely.

In this connection, inasmuch as Dr. Dohme has taken up this investigation, I would like to call his attention to one direction, if he deem it feasible to work, and that is distillation of ergot. I obtained a very peculiar distillate which smelled very strong, and was of a decided violet color. This distillate changed in color, and upon standing a day or two, presented a very peculiar fluoresence. Before I could examine this distillate—it was in the summer and exceedingly warm—it underwent decomposition. I think it would be a very interesting subject to follow up. The principles, as we know, are the result of the reaction of the water on the ergot, and if these should be volatile to any considerable degree, it would be interesting to know to what extent they could be secured by distillation.

DR. DOHME: In reply to Professor Hallberg, I would say that the reason mention was made of ergotine was simply to call attention to the fact that the name ergotine is a misnomer. There are other Ergotines besides Bonjean's and Wiggers', I think. There is one in Germany called ergotine Bombalon, or some similar name. In reference to the ergot work, I would say, we are now trying in my laboratory to make this so-called cornutine of Keller in quantity. If we find it is uniform, we will then try its physiological effect. If we find that it produces the physiological effects of ergot, we will be justified in assuming that it is the active principle of ergot, at least one of them, especially if it should be active in very small doses. Mr. Keller did make physiological experiments with this drug, and he found that it did produce the physiological effects of ergot, but to what extent he did not state. It is, at any rate, a step in the right direction. We are getting hold of facts that we have been laboring for for twenty-five or thirty years, and if we can show that cornutine is a homogeneous substance, I think we have made an advance. I will state that this is simply a preliminary paper.

MR. LLOYD: I would like to ask Professor Hallberg if he is sure that the still in which he boiled the ergot and the water did not froth over. It seems to me the violet color may have come from a little of the liquid flowing over into the distillate.

MR. HALLBERG: I guarded against foaming, and I don't think it boiled over, because I also covered the still with a pretty close cloth to prevent foaming, and that ordinarily prevents the foam from passing over into the condenser.

THE ALKALOIDAL VALUE OF JABORANDI LEAVES.

BY ALFRED R. L. DOHME.

QUERY 15.—Is the decidedly different yield of pilocarpine due to two species of Pilocarpus? If so, what are the species, and what is their relative content of alkaloids? If not, why has pilocarpine been so scarce?

Pilocarpus pennatifolius, *Lemaire*, is generally considered to be the same as Pilocarpus pauciflorus, *Saint Hilaire*, and Pilocarpus officinalis, *Poehl.* Recently a variety of jaborandi leaves has come into the market called Pilocarpus microphyllus, consisting of small young leaves of the same shape as those of P. pennatifolius, but about one-third as large. Whether or not this has been determined to be a distinct species cannot be definitely stated here. Jaborandi contains, besides considerable of an oil, which is the terpene pilocarpene $C_{10}H_{16}$, the following alkaloids:

Pilocarpine, crystals, soluble in water, formula $C_{11}H_{16}N_2O_2$.
Pilocarpidine, not crystalline, soluble in water, formula $C_{10}H_{14}N_2O_2$.
Jaborine, amorphous, insoluble in water, formula $C_{22}H_{32}N_4O_4$.

As far as is known, all these alkaloids possess similar physiological action upon the human economy, being powerful diaphoretics, pilocarpine being, however, the most active. In assaying them all the alkaloids are determined together, no method for determining them separately having as yet been devised. In order to decide the question and answer the query, several samples of both Pilocarpus pennatifolius and P. microphyllus were powdered and subjected to assay by the method of Keller, as follows: 12 grammes of powdered drug are shaken in 200 C.c. flask with 90 grammes of ether and 30 grammes of chloroform. After five minutes add 10 C.c. of ammonia (10 per cent.) and shake. Pour off 100 grammes of the clear solution into a separatory funnel and shake this three times with 25 C.c., 15 C.c. and 10 C.c. respectively of a one per cent. solution of hydrochloric acid. The combined acid solutions are made alkaline in the separatory funnel with an excess of ammonia and shaken out twice with fifty grammes of a chloroform-ether mixture, which is evaporated from a small beaker, and titrated with decinormal acid solution. The following results were obtained by this method:

Pilocarpus pennatifolius	I.	purchased in	1893—0.33	per cent.	total	alkaloids.		
"	"	II.	"	"	1894—0.18	"	"	"
"	"	III.	"	"	1895—0.19	"	"	"
"	microphyllus	I.	"	"	1894—0.16	"	"	"
"	"	II.	"	"	1895—0.19	"	"	"

From these results it would appear that Pilocarpus pennatifolius formerly obtained, contained more alkaloid than the leaves recently obtained in this market. P. microphyllus, which has only made its appearance in this market during the last few years, contains as much alkaloid as the P.

pennatifolius now in the market, and both contain less than the jaborandi leaves formerly obtained. The answer to the query then would be that the cause of the scarcity of pilocarpine is not the preponderance or substitution of any new variety of jaborandi leaves, but the deterioration of the drug in general, the yield having decreased during the past few years. Pœhl* sometime since obtained as much as 1.97 per cent. alkaloids from jaborandi leaves which he claimed were hairy and not smooth, while Budee & Miller† obtained from the ordinary smooth large leaves such as we usually meet with in this country only as much as 0.19 per cent. alkaloids. Whether the hairy leaves which yield the large percentage of alkaloids are or are not any longer raised, the fact remains that the leaves which are now and have been for some time brought to this market, and apparently to Europe also, are of the smooth variety and contain very much less alkaloid. It is hence probable that until we again manage to import the hairy jaborandi leaves, the chances for the price of pilocarpine declining are not very favorable.

THE CHAIRMAN: Gentlemen, you have heard this paper. Is there any discussion?

MR. CASPARI: There is surely some cause for congratulation that we have found out why the price of pilocarpine has advanced so much. If the yield has deteriorated to such an extent as to have gone down to .19 per cent. from what was supposed to be 1.97 per cent. alkaloids, it shows very clearly why the manufacturers have raised the price.

MR. HALLBERG: A couple of weeks ago a friend of mine showed me a small bottle of pilocarpine, containing about an ounce, and told me what a tremendous price he paid for it, and he suggested that the use of the alkaloid in tuberculosis might have something to do with the increase in price.

THE CHAIRMAN: I will state in reference to pilocarpine tablets, that since the price is high very few of them are sold, and many of those that are sold are returned as soon as the price is known.

MR. RYAN: Some months ago there was an article published by a celebrated physician on the use of pilocarpine in the treatment of tuberculosis, and a great quantity of the substance was demanded all over the country. The demand became quite great to be used hypodermically; it exceeded the pilocarpine that was in the market, and since that time no supplies have been received. That is the history of it.

MR. REMINGTON: I am very glad to have this information in regard to jaborandi leaves. I suppose we all realize that jaborandi is unquestionably the greatest discovery in materia medica within the last twenty years. I will say I believe that the discovery of jaborandi has been the greatest discovery in materia medica in the last twenty years, because there was no drug that had been discovered up to that time, and I suppose there is no drug since, that will take the place of jaborandi in its physiological action as a sialagogue and diaphoretic. There are plenty of drugs we can get to take the place of opium and narcotics and other lines of drugs; but there has been but one jaborandi, and there is reason to believe it will be a long time before we have another. Hence, this

* Pœhl—Untersuchung der Blätter von Pilocarpus officinalis—St. Petersburg, 1879.

† Budee & Miller—Archiv für Pharmacie—216, page 25—1880.

paper is an important one, and what it leads or points to, that the jaborandi yielding the largest amount of pilocarpine is going out of the market or declining, represents a very important fact in the history of agents used for combating disease, and I hope some way will be discovered of either qualifying it or putting it on a basis which will always give to the world a supply of the best kind.

THE CHAIRMAN: I would like to say that when I obtained such very curious results, I at once applied to headquarters. The largest manufacturers of pilocarpine and its salts are in Germany, and when I was there I had occasion to go through their works. I wrote to them about it, and they said, "Of course, we can not get any more of those rich jaborandi leaves; they are not obtainable, and the leaves we get now do not give us two-tenths per cent., any of them, but we have to be glad to get even these. If we do not take these, we cannot get any." I also wrote to another firm in France—I have forgotten the name now—and they gave me the same answer: the only kind they had been able to get was the medium size smooth leaf, and the hairy leaf they could not get.

MR. HALLBERG: It seems to me here is the point: The United States has consuls at all these South American countries, and the Chairman of this Section might correspond with some of the consuls located at these points and find out the real status as to this jaborandi question. I believe there is another cause. Small-pox and measles have been epidemic throughout South and Central America these last few years, and the great remedy is jaborandi. It is possible that the natives have been using these valuable leaves themselves and exporting the inferior quality.

Upon motion of Mr. Alpers, the paper was then referred to the Committee on Publication, and the Section listened to the reading of the two following papers by the same author, which were ordered to take their usual course of reference to the Publication Committee:

A COMPARISON OF THE BEST KNOWN METHODS FOR THE ASSAY OF COCA LEAVES.

BY ALFRED R. L. DOHME.

It is a question which often confronts and probably often puzzles a pharmacist when he is about to assay a certain drug for which there is no official method given in the United States Pharmacopœia, which method of the many proposed for this drug is the best in so far as it will extract the most alkaloid from the drug. Most pharmacists have neither the time nor the inclination to try every method that has been proposed, and hence can never be really sure that the one they have adopted will yield them the best and most satisfactory result, *i. e.* one that will yield the nearest percentage of alkaloid to the true amount in the drug. There is but one way to solve this problem, and that is to compare all the methods on the same specimen of drug. When the Committee of Revision of the U. S. P. decide upon a method of assay for a given drug they proceed in this way, often however devising besides methods of their own which are then compared with the other known and available methods. Below will be found the results of such a comparison of methods for coca leaves, each method having been tried in duplicate, using the same specimen of Erythroxylon

Bolivianum* (Huanuco leaves) of course, in form of a number sixty powder in all. The following methods were employed: Keller's, Beckurts', Schweissinger's, Thompson's, Lyons and Lyons' modified by the author.† Beckurts' method had to be modified, as the resulting residue by the original method contained too much chlorophyll to render an exact determination of the change of color of the indicator possible. The residue was merely redissolved in acid after evaporation to dryness, filtered and retransferred to the chloroform after rendering alkaline with ammonia. The formation of emulsions is very general in case of this drug when shaken in alkaline solution with chloroform or ether, and was encountered in every assay, making the operations more tedious, as time was most frequently resorted to most successfully to bring about a separation of the liquids. The results follow:

Keller's method.....	(*a*) ..0.78 per cent. total alkaloids	}	mean 0.79 per cent. tot. alk
	(*b*) ..0.80 per cent. " "		
Beckurts' method.....	(*a*) ..0.26 per cent. " "	}	mean 0.265 per cent. " "
	(*b*) ..0.27 per cent. " "		
Schweissinger's method..	(*a*) ..0.52 per cent. " "	}	mean 0.505 per cent. " "
	(*b*) ..0.49 per cent. " "		
Thompson's method....	(*a*) ..0.26 per cent. " "	}	mean 0.27 per cent. " "
	(*b*) ..0.28 per cent. " "		
Lyon's method.....	(*a*) ..0.17 per cent. " "	}	mean 0.165 per cent. " "
	(*b*) ..0.16 per cent. " "		
Lyon's method modified.	(*a*) ..0.32 per cent. " "	}	mean 0.31 per cent. " "
	(*b*) ..0.30 per cent. " "		

This shows how very much the different methods vary as to the amount of alkaloid they extract from the drug, and how important it is to use the best one if a correct assay of the drug is to be made. Keller's method so far exceeds all other methods in extracting the most alkaloid from coca leaves that comparisons are entirely out of place, Schweissinger's method, the nearest to it, being as much as forty per cent. out of the way practically.

Baltimore, July 24th, 1895.

THE ALKALOIDAL VALUE OF IPECAC STEMS.

BY ALFRED R. L. DOHME.

In previous experiments it has been shown that the cork cells and those of the cortical parenchyma adjacent to them are the seat of the alkaloids of ipecac root. Furthermore it has been shown that the thinner root contains more alkaloid than the thicker or fancy root.

Since then it has been observed by the writer that what he termed

* See Proceedings Amer. Pharm. Assoc., vol. 41, page 159.

† The modification consisted in using instead of petroleum ether a mixture of 70 parts of petroleum ether and 25 parts of sulphuric ether.

"wiry" root is made up of two parts of the plant, viz.: the stem proper and the part of the plant that merges the root into the stem. While the stems are usually quite straight with a smooth surface, the part that merges it into the root is almost invariably twisted and slightly annulated. This then divided the ipecac root of commerce into three varieties, *root, merging portion* and *stems*, which shall here be designated respectively as fancy root, wiry root, and stems.

Two lots, "A" and "B" of commercial ipecac root were spread out separately, and each divided up into three portions representing "fancy root," "stems," and the "merging portions." All six portions were assayed by Keller's method, using titration with volumetric acid solution, and with the following results:

Ipecac Root, Sample "A."

Fancy root	2.00	per cent. alkaloids.
Wiry root	2.13	" "
Stems	1.77	" "

Ipecac Root, Sample "B."

Fancy root	2.33	per cent. alkaloids.
Wiry root	2.43	" "
Stems	2.15	" "

From these results but one conclusion can be drawn, and that is that the wiry root, as has been shown last year, is richer in alkaloid than the fancy root, and that the stems contain less alkaloid than either the fancy or wiry root, but still contain considerable alkaloid.

Baltimore, June 25, 1895.

The next paper was read in abstract by the author:

NEED OF AUTHORITATIVE STANDARDS FOR ANTISEPTIC SURGICAL DRESSINGS.

BY SEWARD W. WILLIAMS, PH. C., F. C. S.,

"We have standardized preparations in Medicine. We need them in Surgery as well." So says a physician and surgeon of forty-seven years' experience.*

The French Codex gives formulas for a number of antiseptic surgical dressings, and bases the percentage of medication on the weight of finished product. Our National Formulary does so in the case of iodoform and carbolized gauzes; but mentions no others. Why should not the U. S. Pharmacopœia include some definite requirements for antiseptic dressings?

It is the purpose of this paper to show the need of authoritative standards and present views of recognized surgical and pharmaceutical authorities as to the proper basis on which such standards should be established.

* American Druggist and Pharmaceutical Record, May 25, '95, page 306.

In a letter to one of the pharmaceutical journals, March 25*, suggesting that some definite understanding be arrived at in regard to the meaning of percentage as applied to antiseptic dressings, the writer said:

* * * To state the strength of the solution used in medicating as the strength of the dressing signifies very little, for the following reasons:

1. The degree of expression may influence the strength of the product from 10 to 100 per cent.

2. The volatility of certain medications is such that unavoidable loss should be offset by a corresponding increase in the strength of the solution.

It is only reasonable that the percentage stated on labels of antiseptic dressings shall indicate WHAT IS IN THE GAUZE, not what the gauze has been in.

This percentage should mean that in 100 parts of finished product there are a certain number of parts of antiseptic. In undried or unfinished products, commonly called "moist," the amount of water is variable even to the extent of equaling the weight of the gauze itself. It is proper in this class of goods to base percentage on the weight of finished product, minus water. Otherwise there will be no definite weight basis.

* * * Any statement of percentage should obviously be based on weight of finished product, and in the case of woven fabrics it would be desirable to have an established standard for the weight of thread and the number of threads to the inch. Aside from the question—that of percentage—a statement of grains per square yard, or grams per square meter, would be desirable.

In reply to this appeared an article,† by Mr. F. B. Kilmer, of New Brunswick, N. J., in which it is stated that:

* * * A surgical authority would answer that "the strength of an antiseptic surgical dressing is measured by the strength of the solution with which the dressing is impregnated, without reference to the weight, bulk or measure of the fabric that carries the antiseptic." Or, as expressed by Dr. Thomas G. Morton, President of the Philadelphia Academy of Surgery, and one of the most eminent authorities in this country: "When a surgeon directs the application of a 5 per cent. or 10 per cent. dressing upon a wound, he refers to the strength of the solution, and has no reference to the quantity of absorbent cotton, lint, gauze or other material used."

Such is the definition of surgical text-books, lecturers and demonstrators of surgery in colleges and clinics; and such is the practice in hospitals and the understanding of these terms in the world of surgery. Under such a definition, the label on a 5 per cent. carbolized gauze means that the absorbent gauze is thoroughly impregnated with a solution of carbolic acid, and that the said solution contains 5 per cent. of the acid. * * * In fact, as expressed by Dr. Hunter McGuire, one of our most eminent surgeons, "any other way of estimating the strength of gauze would be misleading and mischievous." * * *

The finished-product standard for present day surgical dressings is not only absurd, in the face of all surgical authority, but very dangerous. * * *

It is useless to multiply authorities. Reference to any surgical work or practitioner will give the same answer: "The term to be applied to the dressing is based upon the strength of the impregnating mixture, without reference to the quantity or weight of material composing the dressing, which is only a vehicle for carrying the antiseptic." * * *

This article was answered in the *American Druggist* of May 25th.

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* American Druggist, March 25, '95.

† American Druggist and Pharmaceutical Record, April 25, '95.

To determine which view of the case best accorded with the opinions of leading surgeons and pharmacists, the writer presented the question to recognized authorities in the following form:

THE MEANING OF PERCENTAGE AS APPLIED TO ANTISEPTIC SURGICAL DRESSINGS.

East Orange, N. J. —— ——, 1895.

Dear Doctor:

In the interests of uniformity in surgical dressings and a more thorough understanding of what is wanted by the surgeon when an antiseptic dressing of a certain percentage is specified by him, will you kindly signify your approval or disapproval, respectively, of the following opposing propositions:

Very Respectfully,
S. W. Williams.

No. 1.

It is stated "that a surgical authority would answer that 'the strength of an antiseptic surgical dressing is measured by the strength of the solution with which the dressing is impregnated, without reference to the weight, bulk or measure of the fabric that carries the antiseptic.'"

No. 2.

We believe the percentage appearing on a label should express some relation of the antiseptic to the fabric or other material which is medicated.

For dressings in general we believe percentage should be based on weight of finished product. [Considering wet dressings water is deducted in the calculation so as to admit of a common basis of comparison.] In the case of woven fabrics an additional statement of grains per square yard or grams per square meter is desirable.

Of *all* replies received to date four surgical authorities approve number 1 and forty-four endorse number 2.

THE SURGEON GENERAL'S OPINION.

(A qualified endorsement of number 2.)

Surgeon General Geo. M. Sternberg says: "Dry surgical dressings should be prepared in accordance with proposition number 2. Wet dressings should be prepared by immersing gauze or other porous material in a standard solution of antiseptic agent."

SURGICAL AUTHORITIES APPROVING NUMBER 1.

The following surgical authorities approve number 1:

Dr. Edwin Bentley, Professor of Surgery, Med. Dept. Arkansas Ind. University, Little Rock. J. A. Sutcliffe, A. M., M. D., Professor of Principles and Practice of Surgery, Central College of Physicians and Surgeons, Indianapolis, Ind. F. Cauthorn, A. M., M. D., Professor of Surgery, Med. Dept. Willamette University, Portland, Oregon. Dr. W. B. Rogers, Professor of Surgery, Memphis Hospital Medical College, Memphis, Tenn.

SURGICAL AUTHORITIES APPROVING NUMBER 2.

The following surgical authorities approve number 2.

Dr. Charles McBurney, Professor of Surgery in College of Physicians and Surgeons; Attending Surgeon, Roosevelt Hospital; Consulting Surgeon, St. Luke's, Presbyterian and Orthopædic Hospitals and Hospital for Ruptured and Crippled, New York. Dr. Arpad G. Gerster, Professor of Surgery, New York Polyclinic and Hospital, Visiting Surgeon, Mt. Sinai and German Hospitals, New York. Dr. John A. Wyeth, Professor of Surgery New York Polyclinic; Visiting Surgeon to Mount Sinai Hospital; Consulting Surgeon to St. Elizabeth Hospital; President of the Faculty. Dr. B. Farquhar Curtis, Professor of Clinical Surgery, New York Post-Graduate Medical School and Hospital; Surgeon to St. Luke's and N. Y. Cancer Hospital, and Professor of Clinical Surgery, Woman's Medical College. Dr. Daniel Lewis, Professor of Special Surgery, New York Post-Graduate Medical School and Hospital, Surgeon to Skin and Cancer Hospital, New York. Dr. Willy Meyer, Professor of Clinical Surgery, New York Post Graduate Medical School and Hospital; Surgeon to German Hospital; Attending Surgeon New York Skin and Cancer Hospital. Samuel Lloyd, B. Sc., M. D., Instructor in Clinical Surgery New York Post-Graduate Medical School and Hospital; Visiting Surgeon Randall's Island Hospitals. Dr. Joseph D. Bryant, Professor of Operative and Clinical Surgery Bellevue Hospital Medical College of the City of New York; Consulting Surgeon Gouverneur Hospital and St. Joseph's Hospital; Visiting Surgeon Bellevue and St. Vincent's Hospitals, New York. Dr. W. H. Carmalt, Professor of Surgery, Yale University; Attending Surgeon, New Haven Hospital. Dr. Howard A. Kelly, Professor of Gynæcology, Johns Hopkins University, Baltimore. Dr. H. H. Biedler, Professor of Surgery, Baltimore University School of Medicine. Dr. A. Vander Veer, Professor of Surgery Albany Medical College. Dr. John Van Duyn, Professor of Surgery, College of Medicine, Syracuse University. Dr. Roswell Park, Professor of Surgery, University of Buffalo. Dr. Nicholas Senn, Professor of Surgery, Rush Medical College, Chicago; Founder of the Association of Military Surgeons of the United States. Dr. D. A. K. Steele, President, and Professor of Principles and Practice of Surgery and Clinical Surgery, College of Physicans and Surgeons of Chicago. Dr. L. L. McArthur, Professor of Surgery, Post-Graduate Medical School and Hospital of Chicago. Dr. J. B. Murdoch. Professor of Surgery, Western Pennsylvania Medical College, Pittsburgh, Pa, Dr. J. Somers Buist, Professor of Surgery, Medical College, State of South Carolina. G. A. Baxter, A. M., M. D., Professor of Surgery, Chattanooga Medical College. Dr. Edmund J. A. Rogers, Professor of Surgery, University of Denver, Colorado. Dr. John Boice, Professor of Surgery, Gross Medical College, Denver. J. C. McClintock, A. M., M. D., Professor of Surgery, Kansas Medical College, Topeka. James M.

Holloway, A. M., M. D., Professor of Clinical Surgery, Louisville Medical College, and Kentucky School of Medicine. Dr. Rudolph Matas, Professor Surgery, Tulane University, New Orleans, La. Dr. E. H. Gregory, Professor of Principles and Practice of Surgery and Clinical Surgery, St. Louis Medical College. Dr. H. H. Mudd, Dean and Professor of Clinical Surgery, St. Louis Medical College. Dr. Jacob Geiger, Professor of Surgery, Marion Sims College of Medicine, St. Louis, Mo. Dr. J. G. Griffith, Professor of Surgery, Kansas City (Mo.) Medical College. Dr. S. E. Josephi, Dean, Medical Department, University of Oregon, Portland, Or. Dr. Edwin B. Cragin, Gynæcologist, Roosevelt and New York Cancer Hospitals, New York. Dr. Frank Hartley, Visiting Surgeon Bellevue, Attending Surgeon Roosevelt Hospital, New York. Dr. William Pierson, Medical Director St. Michael's Hospital, Newark, and Surgeon to Memorial Hospital, Orange, N. J., President attending staff. Dr. Joseph Fewsmith, Surgeon to St. Michael's Hospital, Newark, N. J. Dr. H. C. H. Herold, Surgeon to St. Michael's Hospital, Newark, N. J. Dr. J. C. Young, Surgeon to St. Michael's Hospital, Newark, N. J. Dr. Edward J. Ill, Surgeon to St. Michael's Hospital, Newark, N. J. Dr. W. J. Chandler, Surgeon to Memorial Hospital, Orange, N. J. Dr. J. W. Stickler, Surgeon to Memorial Hospital, Orange, N. J. Dr. T. W. Harvey, Surgeon to Memorial Hospital, Orange, N. J. Dr. T. Mitchell Prudden, the eminent bacteriologist of New York. Dr. Dwight L. Cone, Professor of Operative Surgery, College of Physicians and Surgeons, Boston. Dr. J. P. Elliott, Professor of Didactic Surgery, College of Physicians and Surgeons, Boston. Dr. W. H. K. Davis, East Orange, N. J. Dr. R. Williams, Le Roy, New York.

PHARMACEUTICAL AUTHORITY APPROVING NUMBER 1.

(A qualified endorsement of number 1.)

Carl S. N. Hallberg, Ph. G., Professor of Pharmacy, Chicago College of Pharmacy; Professor of Materia Medica and Pharmacy, Chicago Summer School of Medicine; Director National Institute of Pharmacy; Member Committee of Revision U. S. Pharmacopœia. (This reply is qualified, number 1 being favored for water-soluble antiseptics and number 2 for water-insoluble substances, as iodoform, etc.)

PHARMACEUTICAL AUTHORITIES APPROVING NUMBER 2.

Dr. Charles Rice, Chairman of the Committee of Revision of the U. S. Pharmacopœia; Chemist of the Dept. of Public Charities and Correction of New York City. Dr. A. B. Prescott, Dean of the University of Michigan School of Pharmacy. Virgil Coblentz, A. M., Ph. G., Ph. D., F. C. S., Professor of Pharmacy in the College of Pharmacy of the city of New York. George F. H. Markoe, A. M., Ph. G., Professor of Pharmacy, Mass. College of Pharmacy; Formerly Professor of Materia Medica, Harvard

University Medical School, Member Committee of Revision U. S. Pharmacopœia. William C. Anderson, Ph. G., Professor of Theory and Practice of Pharmacy, Brooklyn College of Pharmacy. Dr. A. B. Huested, Professor of Pharmacy, Albany College of Pharmacy. Willis G. Gregory, Ph. G., M. D., Professor of Pharmacy, Buffalo College of Pharmacy; Member Committee of Revision U. S. P. Oscar Oldberg, Phar. D., Dean and Professor of Pharmacy Northwestern University School of Pharmacy; Member Committee of Revision U. S. P. Otto A. Wall, Ph. G., M. D., Prof. of Pharmacognosy, St. Louis College of Pharmacy, Member Committee of Revision U. S. P. Lucius E. Sayre, Ph. G., Professor of Pharmacy, University of Kansas School of Pharmacy; Member Committee of Revision, U. S. P. W. M. Searby, Ph. G., Dean and Professor of Pharmacy, California College of Pharmacy. George B. Kauffman, Ph. G., Professor of Pharmacy, Ohio State University School of Pharmacy. Charles T. P. Fennel, Ph. G., Professor of Pharmacy, Cincinnati College of Pharmacy, Chemist to Ohio Drug Commission. Charles Caspari, Jr., Ph. G., Professor of Pharmacy, Maryland College of Pharmacy. C. Lewis Diehl, Ph. M., Louisville, Ky., Member Committee of Revision U. S. P. Wiley Rogers, M. D., Ph. D., Professor of Pharmacy, Louisville School of Pharmacy; Secretary State Board of Pharmacy of Kentucky. Frederick J. Wulling, Ph. G., Dean, Professor of Theory and Practice of Pharmacy and Pharmaceutical Chemistry, University of Minnesota College of Pharmacy, Minneapolis. August Drescher, A. B., Ph. G., President and Professor of Pharmacy, New Jersey College of Pharmacy, Newark. Edward Kremers, Ph. G., Professor of Pharmacy, University of Wisconsin School of Pharmacy, Madison. E. A. Ruddiman, Ph. M., M. D., Professor of Pharmacy, Vanderbilt University School of Pharmacy, Nashville, Tenn. J. H. Beal, Ph. G., Professor of Pharmacy, Dept. of Pharmacy, Scio College, Ohio. Alfred R. L. Dohme, Ph. D., Chairman Section on Scientific Papers, A. Ph. A., Baltimore. Wilbur L. Scoville, Ph. G., Professor of Applied Pharmacy, Massachusetts College of Pharmacy, Boston. Henry Kræmer, Ph. G., Professor of Botany, Materia Medica and Pharmacognosy Northwestern University School of Pharmacy, Recently Reporter on Progress of Pharmacy, A. Ph. A. J. B. Nagelvoort, Professor of Applied Pharmaceutical Chemistry, Northwestern University School of Pharmacy. A. B. Stevens, Ph. C., Professor of Pharmacy, University of Michigan School of Pharmacy. Dr. Geo. F. Payne, Professor of Pharmacy, Atlanta College of Pharmacy, State Chemist, Member State Board of Pharmacy, Georgia. David Walker, Ph. G., Professor of Pharmacy, Kansas City (Mo.), College of Pharmacy. Brig. S. Young, Ph. G., Principal Pharmacy Department, Ohio Normal University, Ada, O. L. Myers Connor, Ph. G., Dallas, Texas.

One authority, favorable to number 2, requested that his views should not be published.

The writer has suppressed no reply received up to date. All letters received before August 5th appear as a symposium of the colleges in the *American Druggist* of August 10th, to which reference is made. Time and space will admit of presenting in this paper but a few representative views:

DR. GERSTER'S OPINION.

No one is in a better position to speak for the College, the Hospital, and the Standard Work on Surgery than Dr. Arpad G. Gerster.

He says of Number 1: "Absurd;" of Number 2: "This is rational and the proper thing."

AS VIEWED BY DR. CHARLES RICE.

Dr. Rice says, in his reply:*

* * * It is, indeed high time that this matter be finally settled, and I am sure that the controversy which has recently arisen regarding the matter will help to dissipate the fog surrounding it. * * *

I have reason to know that the leading surgeons of New York City interpret the meaning of "percentage" in antiseptic dressings as I do—that is, they choose or designate dressings *by what is in them*, and not by what they were dipped in. * * *

THE DEFINITION OF PERCENTAGE DRESSINGS.

In attempting to draw up the definition of "percentage dressings" in the sense of "actual percentage contents," we encounter a point which is of some importance, and regarding which an agreement must be arrived at. It is this: Should a certain dressing, for instance, a 10 per cent. iodoform gauze, be one that contains the stated percentage (10 of iodoform) as referred to the *original gauze*, or should it refer to the finished *product?* Certain kinds of dressings, such as iodoform gauze, cannot be properly made without the intervention of some agent that helps to hold the iodoform to the fabric—for instance, glycerin. This not being volatile, will, of course, remain in the dressing after the alcohol or other volatile liquids also used in the preparation of the fabric have evaporated, and makes up part of the final weight, so that a 10 per cent. iodoform gauze may contain:

10 parts of iodoform, 10 of glycerin and 80 of gauze; or

10 parts of iodoform, 15 of glycerin and 75 of gauze, etc.

The question now is, shall the percentage refer to the gauze, irrespective of the "adhesive" or other inert matters present? It is evidently in the interest of all, the surgeons as well as the manufacturers, to refer the percentage to the *final product, inclusive of glycerin, etc.*, since in this case the quantitative determination of the percentage of the antiseptic agent is a matter of comparative simplicity, and permits comparison among the products of various makers, while otherwise it would be necessary, not only to extract the antiseptic agent, but also to restore the gauze to its original, unimpregnated condition, which would be, to say the least, in many cases impracticable.

Instead of making a definition of an antiseptic dressing, the strength of which is expressed by percentage, it will be more convenient to formulate a *rule*, as follows:

RULE FOR EXPRESSING OR INTERPRETING PERCENTAGE IN MEDICATED DRESSINGS.

The percentage strength of a prepared medicated dressing refers to, or expresses, the

* Dr. Rice's letter appears in full in American Druggist, May 25, p. 305.

weight of the medicinal agent in 100 parts of the finished product, calculated as being dry, or as having been dried as far as possible—that is, free or assumed to have been freea from water, alcohol and other volatile solvents.

It is a very good plan, as you suggest, to express the strength also in grains per square yard or grams per square meter, but I think that this should not supersede the percentage form of statement, which is the most easy to pronounce, to write, or to remember.

CHAS. RICE.

DR. PRESCOTT'S VIEWS.

In his letter Dr. Prescott says:*

* * * Without designation I should understand a statement of percentage of the antiseptic to be based upon the weight of the finished dressing. A statement of so many grains per yard or grams per meter would be entirely legitimate. In the case of water moist dressings, the quantity of moisture in a dressing, and especially the quantity of water in contact with the dressing while it is in use, must be a somewhat variable and uncertain quantity. On the other hand, the weight or the area of the dressing is a constant quite suitable for a statement of concentration.

ALBERT B. PRESCOTT.

THE "VEHICLE" IDEA.

The principal argument against "percentage on finished product" is that the gauze, cotton or other material is merely a "vehicle for carrying the antiseptic." May we ask what plain sterilized gauze is called when used as a simple aseptic dressing? A vehicle is supposed to carry something. This carries nothing. Is it not, however, a dressing, and, if so, why does it cease to be a dressing when medicated? Why should we not speak of dressings, plain or medicated?

One journal† goes so far as to compare the gauze with cloth on which plasters are spread. When we speak of a plaster we properly refer to the mass itself. This is the way the term is used in the Pharmacopœia. If the mass is spread we speak of a spread plaster. To carry out the far-fetched analogy in the case of antiseptic dressings, we should talk of diffused or extended solutions, not necessarily naming the material which constitutes the body of the dressing. In arguing this point, the journal alluded to says:

* * * For instance, the carbolized gauze of the National Formulary consists of an ointment or plaster mass which is adhesive and more or less fatty, which contains a definite percentage of carbolic acid, and which is, by means of heat or by the use of an alcoholic solvent, distributed over the surface of the fabric or gauze used. The percentage really applies to the mass or mixture. This is of a definite strength.

This illustrates to what length some people will go, in efforts to prove a point of minor consequence. Reference to the National Formulary shows that the gauze is directed to be immersed in an alcoholic solution, con-

* Dr. Prescott's letter appears in full in American Druggist, May 25, p. 305.

† *Pharmaceutical Era*, June 20, 1895, p. 776.

taining approximately 3½ per cent. carbolic acid, 1¾ per cent. castor oil, and 14 per cent. resin.

The National Formulary says: "The impregnated gauze, when dry, contains about 2½ per cent. of carbolic acid." The strength here stated is not the percentage strength of the solution employed in impregnating the gauze; but is the percentage based on the weight of finished product.

Two other points are urged. One is that gauzes, the strength of which is based on the weight of finished product, are dangerously strong. The other is that makers operating on this principle use gauze not as heavy as that employed by certain others working on the "vehicle idea," and that therefore the former will carry less antiseptic to the yard than the latter. The *obvious conflict* of these arguments was presumably not intended.

The French Codex has two standard weights of gauze, one of which is lighter than that criticised, and in England a gauze much lighter still is used as affording better drainage—the dressing being viewed from a surgical rather than from a dry-goods standpoint.

According to proposition number 1, the surgeon who buys five yards of iodoform gauze should understand that the expensive medication he is supposed to be paying for bears no relation to the measure upon which the price is based; or if he purchase a pound of iodoform cotton, that the quantity of iodoform present has no reference to the weight which determines the amount he is charged for the dressing.

In order to guarantee anything like uniformity, the manufacturer, who advocates number 1, is obliged to state that the medication in his gauze is graduated to a certain weight of antiseptic per a certain measure of fabric, or adopt some statement by which the medication is made to have a direct "reference to the measure, or weight of material composing the dressing."

In other words he must abandon his original position, negative his own claims, and surrender to number 2.

The truth of the matter is that number 1 accords with *extemporaneous* bed-side medication. When a surgeon goes to his pharmacist for a *prepared* antiseptic dressing, he expects something more pharmaceutical and more definite than anything it is practical to make with no other facilities than a bowl of antiseptic solution and possibly a clothes-wringer.

Dressings prepared according to number 1 bear much the same relation to products according with number 2 that the old extemporaneous infusions and decoctions do to the standardized medicinal preparations of to-day.

Number 1, from the standpoint of the pharmacist or manufacturing chemist, is retrogression. Number 2 provides for much the same progress in surgical dressings that has taken place in pharmaceutical preparations generally.

The writer again asks, as he did in the initial article of the present dis-

cussion, for a standard weight and count of thread in woven fabrics used for dressings. We should have standard fabrics for medication, although the additional statement of grains per square yard, or grams per square metre, obviously makes the weight of the gauze a comparatively unimportant consideration.

In the case of medicated cotton, jute, oakum, wool, etc., probably no statement of strength is better than percentage on finished product. Percentage on finished product is applicable to all dressings (it being understood, as originally stated, that in order to secure a common basis for comparison, water may be deducted in calculating the amount of antiseptic in wet dressings.)

ANALYTICAL CONTROL.

Whatever method of designating the antiseptic strength of dressings be adopted, it should certainly admit of analytical control. Number 2 provides for this. Number 1 does not. Assay processes have been published.* They should be used, and, if possible, improved upon. The pharmacist should have practical analytical methods, which will enable him to determine for the surgeons dependent upon him the actual and relative merits of the various makes of goods belonging to the class in question.

IS IT NOT TIME FOR THE A. PH. A. TO TAKE ACTION?

It is quite evident from replies thus far received that the vast majority of surgeons will appreciate and encourage the establishment of standards for antiseptic surgical dressings.

Dr. Rudolph Matas, Professor of Surgery, Medical Department Tulane University, New Orleans, writes:

* * * "I am very much pleased to see this movement to secure uniformity in surgical dressings, and especially in the matter of antiseptic gauzes, so ably started. I desire to be put down on record as emphatically in favor of proposition No. 2, as opposed to proposition No. 1." * *

The following letter also doubtless voices the feeling of many surgeons in regard to this matter:

THE MEDICO-LEGAL SOCIETY OF CHICAGO,
DR. JOHN RIDLON, *Secretary*, 103 State Street,
July 10th, 1895.

MR. SEWARD W. WILLIAMS, East Orange, N. J.

Dear Sir: I have your letter of July 5th, referring to percentage in antiseptic dressings It seems to me there can he no question about the necessity of uniformity and accuracy in the preparation of these dressings, but fail to see how any such uniformity and accuracy can be had, when the matter is left, as it now is, to the fancy of any number of so-called "manufacturing chemists" who are little better than the manufacturers of proprietary and patent medicines. I can only conceive it possible that this matter can be remedied by state or government action in such a way as to make surgical dressings

* Charles E. Parker, Ph. C., has reviewed old assay processes, and proposed new ones, in the *Druggist's Circular* for November, '94, p. 245; January '95, p. 4; June '95, p. 123.

officinal preparations, as are the officinal preparations of the various drugs, and to depend for them and their thorough and accurate preparation upon an educated and trustworthy pharmacist, and not upon the irresponsible and uneducated salesman in the retail drug stores, who can properly lay no claim to the title of pharmacist or pharmacy.

Yours truly, JOHN RIDLON.

(It is but right to say, in connection with this letter, that those manufacturing chemists who have done all in their power to elevate the standard of antiseptic dressings may with justice be accorded a different classification.)

The Doctor's meaning is clear—that the highest pharmaceutical authorities we have should take the matter in hand.

Is it not in the province of this Association to take some definite action toward establishing authoritative standards for antiseptic surgical dressings? And do not the views of Dr. Rice afford a proper basis for such action?

East Orange, N. J., July 18, 1895.

MR. HALLBERG: I move the reference of this paper to the Committee on National Formulary; it might also be proper I suppose to refer it to the Executive Committee for Publication. In doing this I would like to have something to say on this subject. Dr. Rice's authority here, singularly enough, is entirely one-sided. When we consider the question of antiseptic dressings we have got to consider it primarily from the surgeon's standpoint; secondarily, from the standpoint of the pharmacist or analytical chemist. Dr. Rice refers only to iodoform gauze, I believe. He makes no exhibition of any except the iodoform gauze. That is where he is in fatal error. There are two kinds of antiseptic dressings. First, the surgeon desires to place on a wound or on a part of the body a bandage saturated with a solution of a certain strength to prevent inflammation. He knows that mercuric chloride, 1 in 2,000 say, will destroy bacilli. He knows that carbolic acid will have the same effect. He knows that mercuric chloride and salicylic acid solution will have the same effect. Here is a question of presenting a solution of a certain strength, and the question of how large a gauze is used for the purposes of this application is of no consequence or interest to the surgeon. On the other hand, when he desires to apply a substance that is not water-soluble, a substance like iodoform, which is applied in substance by simply dusting some iodoform on the gauze, then he ought to have it, of course, of a certain definite amount of weight. That resolves the gauzes into two kinds: Gauzes that are made of water-soluble substances should be so made that when they are restored to the original condition, to the moist condition, preparatory to being used by the surgeon, they should represent a certain percentage of strength of the solution. Hence the iodoform gauze should represent a certain amount fixed on the weight, or preferably on the area, so that he knows that in applying a certain piece he will have so much iodoform. With reference to the chemist, it may be desirable that a method should be established whereby the percentage of strength of these gauzes can be determined, but we must not adopt that simply for the consideration of the pharmacist. The surgeon's consideration is of the first importance. I would like to see some general formulas incorporated in the National Formulary. As a matter of fact, the more we exploit these subjects the more clearly we must arrive at the conclusion that gauzes, at least of water-soluble substances, ought to be made by the pharmacist extemporaneously as needed. Dry gauzes are not a proper thing to handle, and no physician can use a dry gauze with a water-soluble substance. The pharmacist ought to make these gauzes extemporaneously by saturating these gauzes with a solution of the strength that his surgeon wants to use, and if he should do that then there would be no necessity for the manufacturer to put these on the market, and we would be saved controversies like this.

MR. CASPARI: I beg to differ somewhat from Professor Hallberg. While his remarks carry considerable force with them, I fail to see that a surgeon will be in any more positive position by using a gauze or cotton which has been dipped in a certain percentage solution than he would be in using the other method. For instance, in giving per centages according to the finished product, if he uses a water-soluble substance and dips the gauze or cotton into a percentage solution of it, if it retains the whole amount of moisture, it retains, of course, that uniform strength. But it loses a portion of the moisture, which has to be restored by moistening it again with water just before the application. Now how does the surgeon or nurse know that they get the amount of water needed to produce the percentage originally contained in the gauze? They do not know whether they have restored it to 5 per cent. or 10 per cent. But if you know that the gauze contains so much antiseptic, 1 or 5 or 10 parts to every 100 parts of the total weight, then you know at least how much antiseptic you have present, and can readily calculate the required quantity of water.

MR. HALLBERG: But you have to moisten it, don't you?

MR. CASPARI: Of course, you have to moisten it, but you know that it contains that quantity of mercuric chloride. But in the case of cotton saturated with mercuric chloride solution, when a part of the water has evaporated and you moisten it for the purpose of restoring it to the original condition, you don't know whether you have restored the original strength or not.

MR. HALLBERG: I think you do, just as much as you know in the first instance.

MR. CASPARI: No, sir. If you base it on a certain material you know you have got a certain amount, and you know that 100 grams of cotton contain a certain proportion, and you can add any amount of water and that amount of mercuric chloride stays there. The water is not taken into consideration.

MR. HALLBERG: I beg your pardon. It is the strength of the water solution that the surgeon wants. He don't care whether he uses one ounce or four ounces of cotton. It is the strength of the solution; if it is 1 in 2,000, or any other proportion, it is the amount of the water solution that is added to the material, and not the material itself. The fabric cuts no figure whatsoever.

MR. CASPARI: It does in a great many cases, most assuredly. There are very few cases where that would apply. It seems to me that in all medicated gauzes and cottons there can be but one standard, and that is on the basis of the weight of the finished product, including, of course, the water and material used if you wish accuracy. Unfortunately, the majority of physicians are not well posted in regard to percentage solutions. I say that advisedly. And there are a great many pharmacists just as ignorant. Otherwise we would not have our journals teeming with the question, What is percentage solution? They do not seem to appreciate that a percentage solution means so many parts in a hundred. Professor Hallberg knows just as well as I do that that is a question that has been in the journals for a great many years. They say that a ten per cent. cotton gauze is cotton dipped into a solution of that strength and taken out. We all know that the amount of moisture will differ, and the amount of the ingredient retained by that cotton must vary still more. It depends entirely upon the expression, how much will be lost by evaporation, and there is only a certain amount that we can overcome. But when we have a certain quantity of an ingredient based upon the weight of the finished product, counting, of course, the weight of the water, glycerin or oil, or whatever we have, then we can say that this cotton contains so much of the active ingredient used. Just so long as physicians continue to prescribe and pharmacists to dispense, there will be a difference

of opinion, I think. I doubt very much if we will be able to overcome the differences. And largely the differences are owing to the fact that manufacturers use gauzes of different weight per square yard or meter. The "Pharmaceutical Era" published an article calling attention to the different weights of cotton used by different manufacturers, and I think that article must have convinced every reader that the variation is great. I cannot see how any one can depart from the maxim that percentage preparations require a certain quantity, based upon the weight of the finished product. Of course, if we have cotton gauzes moistened with water, glycerin or oil, we must take these into consideration in figuring the percentage.

MR. GOOD: I want to endorse Professor Hallberg's position in this matter. I think it is absolutely correct. To speak of a certain amount of cotton as the antiseptic seems to me the height of absurdity. What you wish to apply is to take the moist gauze and apply a certain strength of solution. You apply that solution, so much of a 10 per cent. solution, we will say, for instance; the cotton is simply the fabric which you use in carrying that solution to the wound. That is all it is. If you go to make a corrosive sublimate gauze of cotton on the basis of ten or one per cent., one part of corrosive sublimate to ninety-nine parts of cotton, what you apply to the wound is absolutely pure corrosive sublimate, and the cotton cuts no figure, and you will find you will do considerable damage. It is necessary to have the moist gauze, and what you apply is this solution, whatever it is, and the cotton cuts no figure, but simply helps to apply it. I am impelled to take the position of No. 1 in this matter. You can take iodoform and you can calculate the iodoform gauze on the basis of 10 or 50, or 1 per cent., and it doesn't make any difference what you apply, if it is pure iodoform, because it does no harm. The weight of the fabric cuts no figure; you can touch it to the wound, but it is simply the thing that is used in conveying the iodoform to the wound.

MR. REMINGTON: I have kept entirely out of this controversy that has been going on in the journals, for I was able to see, I think, two sides to this question in the beginning; but I think I now see a little farther into this subject. It has gotten beyond the mere question of the pharmacist making gauzes for himself. These gauzes are in great demand, and very largely used by physicians and surgeons, and when they were originally prepared, undoubtedly the intention was to prepare them in the simplest possible manner. They were largely prepared for hospitals, in many cases by the hospital attendants and nurses, and the easiest way to prepare them was to dip the gauze into these various solutions. But they have gotten now to be a commercial product; various firms manufacture them; competition has come in, and it seems to me that the time has arrived for us to get on a solid, substantial basis. The question of these moist gauzes is very largely a question of evaporation. They may be made of different strength and the manufacturer puts a label upon his preparation, but when they get into the hands of the physician and surgeon, they will not be the thing which they were originally. There is no solid basis to get upon in this matter, but to have the finished product contain, either according to area or according to weight, a definite amount of the medicating material; and until we get on that basis, we will have no solid ground to stand upon. Professor Hallberg, when he makes these solutions, knows what they are, but it is a commercial question now. It has gotten out into the broad field of competition, and it has prompted some manufacturers to label their goods a certain thing and others a certain thing, and the physician and surgeon does not know what that is. But when we get on the basis of the finished product representing a definite amount of medicating material, we have reached solid ground; and until we do, we will never be on safe ground. Now let the manufacturer, if he chooses, put on his label what the equivalent is. Let him say that this is made from a 10 per cent. solution, if he chooses to satisfy the ordinary demand, but let him put upon the box or container exactly how much 100 grams of that gauze

represents in medicating material. Let it be there, then we will be on a safe basis altogether.

MR. PRESCOTT: The term in this publication has been used, "finished dressings." Is there any better term than that? If a water solution of mercuric chloride is the proper finished dressing, so be it. I have no objection to that. I still say, if it is to be sold as a finished dressing, it should be sold with the percentage of mercuric chloride stated in it. You may say that is not the finished dressing we are talking about, that is not what ought to be used, and not what surgical dressings are. Well, that is a surgical question, whether a dry dressing of mercuric chloride should be bought, and sold, and used. I have nothing to say on that; but whatever it be, as finished dressing, whether the solution is to be supplied by the nurse and moistened, as Professor Hallberg says it ought to be—and I think that would be the best practice as a rule—or whether dry chloride, it manifestly ought to be stated upon that finished dressing. It may be that a dry dressing of mercuric chloride is not the proper thing to use. But if they do have it, they should have, it seems to me, the definite percentage stated and proper directions given as to the amount of water to be used with it.

MR. ALPERS: Those who have followed this question in the pharmaceutical journals for the past six months know that this whole thing is the outcome of the rivalry between two manufacturing firms. I do not say that this identical paper has been read by me in the journals, but I have seen all the statements made at different times. If we consider only the large authority read on No. 2, of course, we think that No. 2 has the preference; but we have not heard from both sides and we ought to wait for the other side, as it may outweigh this one. So far as the question of dressings is concerned, I could never get it through my head that the weight or area of the material could have anything to do with it, and I cannot think so now. For instance, take a square inch of gauze which is to represent 1 to 2000 mercuric chloride. They will weigh this square inch, and this square inch must contain 1 to 2000 mercuric chloride. Now if I take a heavier weight and put 1 to 2000 I get a good deal more to the square inch, because different gauzes would contain quite a different amount. There is no certainty at all. But we must start with a certain kind of gauze that weighs so much per square inch. I cannot see how any dressing that is based on a water solution can be measured except by making that solution and dipping the gauze into it. And all the physicians I have consulted—although they are not prominent names, but honest and successful practitioners in their locality—have this view. They prepare their solution of a certain strength and dip the cotton into that solution and apply it. Then they are sure that they get a solution of 1 to 2000 on the patient. Of course, it is quite a different thing when dry powder is applied. It is material how much there is on the part; they just sprinkle it on the wound and then put the cotton on it. I cannot get it through my head that such materials as these can be measured by the square inch or by the weight.

Mr. Good here introduced Dr. Jackson of Denver, formerly of Philadelphia, and upon motion of Mr. Remington Dr. Jackson was allowed the privilege of the floor for the purpose of giving the views of a physician and surgeon upon this subject.

DR. JACKSON: I can assure you the discussion has been really very interesting to me, and it seems to me a matter of importance to the surgeon as well as to the pharmacist, and I think the large number of surgeons who have responded to the request of the author of the paper indicates a wide interest in the subject. As to reaching a decision of the question, it seems to me that the answer of Surgeon-General Sternberg on page 3 of

the paper, is probably the nearest approach to it. He says, "Dry surgical dressings should be prepared in accordance with proposition No. 2. Wet dressings should be prepared by immersing gauze or other porous material in a standard solution of antiseptic agent." Now, I think there are two entirely distinct uses for surgical dressings, which, if they were brought out clearly, would perhaps bring about an agreement between the two pretty distinct sides which there seem to be the discussion. Surgical dressings are used sometimes to medicate a wound; they are used more generally as an efficient barrier against infection from the outside. When used to medicate a wound I think usually they would come under the head of wet dressings; that is, dressings prepared from a solution and never having been dried, and of course they would be prepared of a solution of standard strength. As they are used as a barrier against infection from without, they are commonly applied dry, and more generally not applied immediately to the wound, but with some inner dressing between them, and only become active as the moisture or discharges from the wound soak into the dressing and liberate the antiseptic substance with which it is charged. It seems to me that if we use a dry dressing, a preparation which gives the definite amount of the drug in the finished product is the proper thing to come from the manufacturer to the pharmacist and from the pharmacist to the surgeon. That then, if such a preparation were desired to be utilized for a wet dressing, of course, the thing to do would be to add a definite amount of water to it. (Applause.)

Mr. Good: I would like to say a word in answer to Mr. Prescott. It is not a question, after all, of mathematical calculation. If it were, there would be no chance of disagreement. We are all agreed as to what percentage means. It is only based on the relative weights, that is clear enough. Percentage is the relative weights of the two products, and if it means that, why it is useless and fruitless this sort of discussion, and that is what has led to the confusion.

Mr. Prescott: It seems to me that the only question among us all is whether a dry surgical dressing of a water-soluble substance is a suitable thing to offer a surgeon or not. I have no opinion on that subject.

Mr. Hallberg: I want to say that Dr. Jackson gave the absolutely correct modern acceptation of the theory of septic as well as antiseptic solutions. You can make no general rule. There is a septic and antiseptic side. For one purpose the dressing is better applied dry, and for the other purpose it is necessary to have a solution of standard strength. My position here, I notice, is exactly that of Surgeon-General Sternberg, and it cannot be successfully disputed by any one who gives sufficient thought to the subject.

Mr. Williams: I quite agree with Professor Hallberg in that surgeons should have the say in this matter, and that is why I wrote to so many of them. And forty-four out of forty-eight having endorsed No. 2, I consider it as satisfactorily settled from the surgeon's stand-point that the surgeons of the United States very largely endorse No. 2. Now, I have written to two prominent surgeons who have taken the other side, begging them to give their arguments in the matter, and have been only able to get the return card of a registered letter. They do not seem to be desirous of giving arguments on that side of the question, as far as I have been able to find out. I explained that I was seeking opinions and not endorsements.

So much for the surgeons. Now in regard to percentage solutions which Professor Hallberg speaks of, I have only to say if the solution is a dressing let us speak of it as a dressing, and let the label say this gauze is saturated with a solution which contains a certain percentage of antiseptic. But that has not been the custom anywhere heretofore. And I may say as a fact that the prominent advocates of No. 1 have changed their views, and are now stating that a certain iodoform gauze, for instance 10 per cent., represents

10 parts of iodoform and 90 parts gauze, a complete flop since this discussion was inaugurated.

Now, in reply to what Professor Good said in regard to the cotton and gauze being merely the vehicle for conveying the antiseptic to the wound, I would like to treat that from a commercial standpoint, and say, if I go into Professor Good's store and ask for a pound of antiseptic cotton—we will say it is expensive antiseptic—he charges a certain amount. That price is supposed to represent principally 10 per cent. of the weight of that cotton of the particular medication; but according to Professor Good's idea, neither he nor I know how much that pound of cotton contains. It seems to me there is a difficulty there from a commercial standpoint. There is no telling how much there is in a pound of cotton or five yards of gauze; we are absolutely in ignorance of what we are buying.

In regard to the degree of moisture in dressing, it is a fact that many antiseptics require a certain amount of moisture to make them active. The term "dry-dressing" is generally a misnomer, because usually slightly moistened with glycerin and hygroscopic moisture held by it. If we make them wet over and above the amount of moisture to make the antiseptic active, that simply tends to satisfy the absorptive qualities of the dressing itself. The value of these dressings in very many cases is their absorptive quality. If you fill them with water, how are they going to take up any more?

In regard to what has been said relative to the reduction of corrosive sublimate, of course distilled water should be used. It is a fact that ordinary cellulose has the effect of reducing corrosive sublimate, particularly the wood gum, and, as we all know, corrosive sublimate is readily reduced by discharges from the wound as well. In fact, I do not think that corrosive sublimate stands where it did a few years ago as an antiseptic.

In reply to Mr. Alpers, in regard to calculating the weight of antiseptic to the area, I should say he has figured weight to weight, and not weight to area as he put it. In the case of cotton, you cannot figure it weight for area, because you do not know how much a yard would amount to; but this statement of "grains per square yard" means that a yard of gauze contains so many grains of antiseptic, no matter how much the yard weighs—that a certain area contains so many grains of the antiseptic, or grammes per meter, as the case may be.

As to what Dr. Jackson said in regard to applying solutions, I would like to refer to a letter from Dr. Carmalt, of Yale University, in the symposium report referred to, in which he states that they use sublimate solutions and apply them, simply saturating the gauze and keeping it saturated, as a poultice.

In regard to what Prof. Good says. If we talk percentage we must talk mathematics, for percentage cannot be divorced from mathematics. If percentage cannot enter the field of surgery, we have got to find some other way of designating the strength of surgical dressing, and the sooner we find it the better.

I would say as a matter of interest concerning the strength of corrosive sublimate, I do not want to take up your time, but I happen to have here a piece of gauze which came from England and was prepared under Sir Joseph Lister's direction, and contains two-thirds of one per cent. of corrosive sublimate. Now, that is dry. If we can use two-thirds of one per cent., what is the use of buying the 1–2000 preparation.

MR. HALLBERG: If that were moistened with twenty times its weight in water before it was used, then it would be about the per cent. of solution 1–2000. That is the idea, and I think those two terms ought to be distinguished. The label ought to state the amount of active substance dry, and then how much water should be required to reduce it to the solution.

MR. REMINGTON: That is just the whole point, Mr. Chairman—that the label shall contain in plain print just exactly what is in there. This is a question of custom. If we

have been calling 10 per cent. iodoform gauze something which has been dipped in a 10 per cent. solution, call it now 2 per cent. gauze, if you want to state exactly what it contains. Make it honest; put on there just what is in it.

MR. GOOD: I would like to say a word. I guess this is a good discussion. (Laughter.) If you want my assistance in this matter you must not disturb me. If the question had been one of mathematics there could be, of course, no dispute about it, because mathematics does not admit of disputes. It seems to me it was started originally to get at some guides as to what should be considered proper, and the proper way of expressing the medicament used in the antiseptic gauzes. I want to say this, that if it is a question of mathematics there can be no occasion for discussion, and the commercial value of so much cotton and so much acid is easily calculated; but it seems to me that the main object in starting this discussion was to arrive at some practical conclusion for the surgeon, and you cannot successfully contradict the statement that the doctor gives. Confine the pure product to the surface, and you don't have the product diluted 99 to one of the substance.

MR. PRESCOTT: What is the finished product?

MR. GOOD: That has nothing whatever to do with the case, so far as the surgeon is concerned. Commercially it is 1 per cent.; surgically it is 100.

MR. PRESCOTT: How does the manufacturer know how much water the surgeon is going to put on?

MR. GOOD: That is the confusion. It seems to me the point rests with the surgeon. What does he apply to the wound is exactly the thing, not how much cotton you have got and how much corrosive sublimate, but what does the surgeon apply to the wound. Commercially you have got to apply a percentage, but in the surgical and therapeutic uses you have nothing to do with the pecuniary value, nor how much medicant or how much cotton is included.

MR. CASPARI: I received a letter some time ago from a certain manufacturer, stating that possibly I had heard some discussion going on regarding antiseptic dressings, and would I be kind enough to tell what I knew concerning antiseptic dressings? I gave them my opinion and told them exactly what I think, as I have stated here. Probably my answer did not suit them, because they wrote me two days afterward, "In reply to your letter, we beg to enclose some of our latest labels, which please examine." On those labels was printed, "This gauze has been saturated with a ten per cent. iodoform emulsion; 100 parts of this gauze contain 10 parts of iodoform; a square meter of this gauze contains so much iodoform." Now if that gauze was dipped in a 10 per cent. emulsion of iodoform it did not contain 10 per cent. of iodoform; yet the label was made to accommodate all demands, it was to cover both No. 1 and No. 2. It seems the first answer I had given did not satisfy them, so they wanted a special one. In my reply to the first letter I stated exactly what I have stated here to-day, that you could not make a 10 per cent. gauze by dipping it into a 10 per cent. solution.

Upon motion, the paper of Mr. Williams was referred to the Publication Committee, and the Chairman said:

The next paper to be presented is a very interesting one. It is by our ex-President, Mr. Patch, of Boston, and is called "An Analysis of Fifty Thousand Prescriptions Collected all Over This Country." I would like to ask Professor Remington if he will not be so kind as to present this paper to the meeting in the absence of the author.

Professor Remington then read the following paper, which, upon motion of Mr. Alpers, was referred to the Publication Committee :

ANALYSIS OF PRESCRIPTIONS. PRESENTED TO ANNUAL MEETING OF AMERICAN PHARMACEUTICAL ASSOCIATION, DENVER, COL., AUGUST 15, 1895.

BX EDGAR L. PATCH, BOSTON.

Something more than a year ago an effort was made to secure the analysis of 50,000 prescriptions, to determine, if possible, the present drift of medical practice.

Druggists in various sections of our country were requested to furnish reports, and we thought provision had been made to secure the number aimed at, but the labor evidently proved too onerous for some, for after a year's delay, they are still "not quite ready."

We have received complete reports covering 27,000 prescriptions, which we present in the appended table, and also submit a general report upon 4,000 prescriptions not arranged for tabulating.

In this connection, we give several suggestions from Mr. W. C. Alpers, of Bayonne, N. J., contributor of 2,000 prescriptions. He remarks: "A year ago I conducted two stores about two miles apart. The general run of prescriptions in these two stores was entirely different. Whereas Syrup of Tolu leads all other preparations, with 352 calls on 2,000 prescriptions in the one store, in the other it was used very little." "In making my analysis, I kept a separate record of each 250 prescriptions and compared the sets.

"Although there was a variation between the two seasons in which the prescriptions were written, there was hardly any difference between the different sections of the prescriptions of each season. If, therefore, I had only analyzed 500 prescriptions, 250 in winter and 250 in summer, I would have obtained the same result by multiplying with four. From these observations we can conclude that if you can induce 400 druggists to analyze 250 prescriptions each, you will obtain more valuable material than by inducing 50 to analyze 2,000 each." "It matters little if some of the reporters live close together."

The following, from Mr. Albert E. Ebert, of Chicago, who kindly furnished me the valuable report of a similar nature made to the Illinois Pharmaceutical Association, at its Seventh Annual Meeting, June, 1886, is of interest: "In my first report to the State Association, covering 5,268 prescriptions written by 569 physicians, the data has a value quite distinct from that of another contributor representing 4,192 prescriptions written by 8 physicians. Again, the reports should cover different parts of the year to be truly representative."

Our thanks are due to the following named gentlemen sending reports included in the table, and represented by the numbers affixed :

	Prescriptions Analyzed.	Articles used.	Times used.
No. 1. Albert E. Ebert, Chicago	2,000	571	4,371
No. 2. Henry A. Borrell, Philadelphia	1,000	461	2,629
No. 3. Wm. C. Alpers, Bayonne, N. J.	2,000	316	5,875
No. 4. Nelson M. Stem, Philadelphia	1,000	378	2,867
No. 5. Shinn & Baer, Philadelphia	1,000	137	1,701
No. 6. Andrew Blair, Philadelphia	1,000	323	2,506
No. 7. S. A. D. Sheppard, Boston	1,000	303	3,074
No. 8. John S. Godding, Boston	2,000	378	3,232
No. 9. Canning & Patch, Boston	2.000	566	4,331
No. 10. Wm. McIntyre, Philadelphia	1,000	390	3,516
No. 11. Samuel Hilton, Washington, D. C	2,000	515	4,638
No. 12. Chas. Caspari, Jr., Baltimore	1,000	532	2,947
No. 13. Chas. M. Ford, Denver, Col.	2,000	375	6,037
No. 14. Chas. Troppman, San Francisco, Cal.	2,000	526	5,368
No. 15. L. F. Chalin, New Orleans	2,000	526	5,755
No. 16. C. T. P. Fennel, Cincinnati	1,000	326	1,969
No. 17. Francis Hemm, St. Louis	1,000	321	3,832
No. 18. Ambrose Mueller, St. Louis	1,000	358	3,110
No. 19. James M. Good, St. Louis	1,000	431	1,935
Totals	27,000		69,693

The entire report calls for 1,777 different articles, of which 190, or 11.25 per cent., were proprietary articles, not including many elixirs, pills, tablets, fluid extracts, etc., which were of a specified manufacture.

Mr. Thomas Whitfield, of Chicago, furnished a general report upon 4,000 prescriptions, which supplies some interesting data, when we consider it comes from a leading prescription store of one of our largest cities, and represents the prescriptions of prominent physicians. 14.9 per cent. of the number are for pure proprietaries, and but 41.5 per cent. for officials.

Analysis of 4000 prescriptions dispensed by Mr. Thomas Whitfield, 240 Wabash Ave., Chicago, Ills.

	Calls.		Calls.
Acetanilid	79	Lactopeptine	183
Antikamnia	87	Menthol	10
Antipyrine	54	Metric System	47
Bromidia	7	Mixtures	793
Cachets	2	Non-Official	2340
Capsules	652	Official	1660
Cocaine	115	Ointments	337
Diuretin	6	Phenacetine	311
Ess. Pepsin	454	Pills	339
Eucalyptol	2	Plasters	50
Europhen	12	Powders	716
Exalgine	10	Proprietaries	595
Glycerin	194	Sulphonal	167
Homeopathic Remedies	16	Suppositories	19
Hypodermic Tablets	74	Tablet Trit. Arsen. Acid	34

			Calls.				Calls.
Tablet Trit.		Boric Acid	11	Tablet Trit.		Pepsin and Pancreatin	4
"	"	Bism. Subgall	10	"	"	Potass. Chlorate	24
"	"	Calomel	137	"	"	Sodii Bicarb	12
"	"	Dover's Powders	22	"	"	Sodii Salicylate	15
"	"	Mercury Protoiodide	7	"	"	Strychnine	36
"	"	Morphine	2	"	"	Strychnine and Atropine	2
"	"	Pancreatin	4	"	"	Zinc Phos. and Nux Vom.	54

Mr. Chas. M. Troppman, of San Francisco, furnishes a synopsis of his 2000 prescriptions which informs us that

65 per cent.	called for officials, covering	4214	calls.
4 "	" National Formulary	176	"
13 "	for pure proprietaries	525	"
18 "	for other non-officials	263	"

Mr. Wm. E. McIntyre, Philadelphia, shows that his 1000 prescriptions included

89.95 per cent.	U. S. P. products covering	3067	calls.
5.27 "	National Formulary covering	180	"
4.78 "	Proprietary covering	163	"

Mr. Mueller, of St. Louis, dispensed 50 different proprietaries, covering 382 calls on 1000 prescriptions calling for 358 articles covering 3110 calls. About 14 per cent. proprietaries.

Mr. Hemm, of St. Louis, dispensed 38 proprietaries, covering 443 calls, on 1000 prescriptions calling for 321 articles covering 3832 calls. About 11.8 per cent. proprietaries.

Mr. J. G. Godding, of Boston, found 60.9 per cent. of his calls were for U. S. P. products; 2.2 per cent. for National Formulary products; 24.4 per cent. for manufacturers' products; and 12.5 per cent. for other non-officials.

Mr. Hilton, of Washington, D. C., dispensed upon 2000 prescriptions, 742 mixtures, 124 pills, 15 plasters, 376 powders, 50 ointments, 17 suppositories, 304 capsules, 27 triturates, 19 compressed tablets, and 105 proprietary products.

The following table gives the names of the substances used and the number of times each substance was prescribed in the total of 27,000 prescriptions above mentioned:

Absinthium, Oil	1	Acid, Chrysophanic	12	Acid, Oleic	1
Acacia	161	Citric	48	Oxalic	1
Mucilage	227	Gallic	43	Phosphates (Propriet'y)	14
Syrup	139	Hydriodic, Syrup	135	Phosphoric, Diluted	152
Acetanilid	262	Hydrobromic	1	Picric	3
Acid, Arsenous	359	Diluted	18	Pyrogallic	8
Acetic	34	Hydrochloric	40	Pyroligneous	1
Diluted	21	Diluted	357	Salicylic	276
Benzoic	44	Hydrocyanic, Dil.	219	Sulphuric	34
Boric	533	Lactic	6	Aromatic	151
Carbolic	448	Nitric	9	Diluted	113
Oil	1	Diluted	34	Haller s	2
Ointment	43	Nitrohydrochloric	108	Sulphurous	41
Camphoric	6	Diluted	88	Tannic	198
Chromic	3	Nitrous	3	Ointment	4

Acid, Tartaric 14
Aconite 48
Extract 25
Fluid 17
Liniment 6
Tincture 415
Flemming's 21
Aconitine 2
Actæa, Comp'd Syrup 4
Agaricin 8
Albolene 27
Liquid 20
Alcohol 234
Diluted 8
Aletris Cordial (Proprietary). 43
Alkalithia Proprietary) 2
Almond, Mixture. 4
Oil, Bitter 5
Sweet 43
Syrup 8
Aloes 88
Extract 32
Fluid 3
Tincture. 16
Aloes and Myrrh, Tincture.. 12
Aloin 244
Althæa 11
Cream. 3
Decoction. 5
Ointment 1
Syrup 16
Alum 119
Dried 1
Ferric 2
Aluminum, Acetate, Solution. 3
Aceto-Tartrate .. 3
Amber, Oil. 2
Ammonia, Liniment 15
Spirit 3
Aromatic 328
Water 69
Concentrated . 12
Ammoniac, Plaster 5
Ammonium, Acetate 4
Solution ... 272
Benzoate 13
Bromide 168
Carbonate 388
Chloride 788
Citrate 1
Iodide 123
Picrate 1
Salicylate 12
Sulphate 1
Valerianate 1
Amyl Nitrite 8
Angelica, Oil 1
Angostura 1
Bitters (Proprietary) 2
Anise 8
Oil 31
Sugar 2
Spirit 1
Ammoniated 5
Syrup 1
Anodyne Pine Expectorant (Proprietary) 1
Anthemis, Fluid Extract 2
Antikamnia (Proprietary) ... 420
Antifebrin (Proprietary) 135
Antimonial Wine 35
Antimony, Sulphurated 4
Tartrated 30
Antipyrine (Proprietary) 242
Antiseptic, Fichenor's (Proprietary) 6
Apiol 2
Apioline 14
Apocynum, Fluid Extract .. 16
Tincture 1
Apomorphine Hydrochlorate. 33
Arbor Vitæ, Fluid Extract ... 2
Arbutin 1
Aristol (Proprietary) 118
Armenian Bole 1
Aromatic Fluid Extract 1
Aromatic Tincture 3
Arnica Flowers 3
Powdered 2
Fluid Extract 1
Tincture 58
Aroud's Wine (Proprietary) .. 2
Arsenauro (Proprietary) 4
Arsenic, Chloride 5
Iodide 1
Arsenicum (Homeopathic) ... 2
Asafetida 34
Plaster 2
Tincture 16
Asclepias, Fluid Extract 2
Ascepsin (Proprietary) 3
Ash, American, Wine 1
Atropine 6
Sulphate 135
Ointment 3
Avena Sativa, Tincture (Proprietary) 4

Balsam, Fir 1
Peru 56
Tolu 3
Baptisia, Fluid Extract 12
Barium Chloride 1
Baume Tranquille 1
Beef, Extract 8
Juice Proprietary 9
Peptonoids, Liquid 39
Tonic (Proprietary) ... 3
Belladonna 18
Abstract 2
Extract 292
Fluid 29
Liniment 11
Ointment 30
Pellets (Homeopathic) .. 3
Plaster 42
Tincture 295
Benzoin 3
Tincture 17
Comp'd 88
Benzoinol (Proprietary) 14
Benzonaphtol 1
Berberis Aquifolium, Fluid Extract .. 5
Vulgaris, Fluid Extract .. 2
Berberine 2
Bergamot, Oil 9
Bethesda Water 1
Birmensdorf Water 2
Bismuth and Ammonium Citrate 3
Liquid 1
Oleate 1
Salicylate 55
Subcarbonate 88
Subgallate 75
Subiodide 4
Subnitrate 995
Valerianate 5
Blackberry Root, Fluid Extract 10
Black-strap 1
Black Hellebore, Fluid Extract 1
Boldo, Fluid Extract 1
Boneset, Fluid Extract 1
Bovinine (Proprietary) 8
Brandy 123
Bromides, Comp. Syrup (Prop.) 35
Bromidia (Proprietary) 57
Bromine 1
Bromoform 2
Bromo-Caffeine (Proprietary) 6
-Chloralum " 1
-Seltzer " 2
Broom, Decoction 3
Fluid Extract 2
Infusion 3
Buchu 8
Extract 9
Buchu, Fluid Extract 101
Infusion 21
Tincture 3
Buckthorn, Fluid Extract ... 5
Syrup 1
Buffalo Lithia Water 1
Burdock 1
Fluid Extract 1
Tincture 2
Burgreave's Granules (Prop.) 3
Bryonia, Fluid Extract 1
Tincture 12

Cacao Butter 102
Cactina Pellets (Proprietary) 26
Cactus Grandiflora, Fluid Extract 6
Cade Oil 26
Cadmium Iodide 1
Caffeine 112
Citrated 84
Hydrobromate, Gran. Eff. 1
Caffetonique (Proprietary) .. 2
Cajuput, Oil 8
Liniment, Comp'd .. 12
Calamus, Tincture 5
Calcium Bromide 4
Carbonate, Precip .. 11
Chloride 16
Hypophosphite 2
Iodide, Syrup 1
Lactophosphate, Syrup 21
Phosphate 11
Sulphide 20
Calendula, Fluid Extract 4
Tincture 9
Calisaya Essencia (Proprietary) 2
Calumba 3
Extract 2
Fluid Extract 16
Infusion 9
Tincture 92
Camphor 202
Carbolated 2
Liniment 50
Mixture, Parrish 1
Monobromated 39
Oil 4
Ointment 3
Phenique 5
Spirit 97
Canada Snakeroot, Comp'd Syrup 4
Cannabis Indica 3
Extract 50
Fluid Extract .. 16
Tincture 59
Cantharides 4
Cerate 18
Liniment 1
Plaster 20
Tincture 62
Capsicum 118
Fluid Extract 1
Oleoresin 17
Tincture 143
Compound 2
Capsules, Assorted 179
Caramel 23
Caraway, Oil 7
Cardamom, Tincture 9
Compound ... 199
Carlsbad Sprudel Salt 20
Carnipeptones (Proprietary). 1
Carron Oil 2
Cascara, Amarga, Fluid Ext. 1
Sagrada 5
Cordial Proprietary) 34
Extract 52
Fluid Extract 191
Aromatic 93
Tasteless 2
Syrup 1
Tincture 1

Cascarilla, Infusion 2
Tincture 8
Castanea, Fluid Extract..... 10
Castor Oil..... 86
Emulsion..... 2
Castoreum, Tincture..... 7
Catechu..... 1
Tincture, Compound.... 98
Caulophyllum, Fluid Extract 12
Cedar Oil. 5
Celerina (Proprietary) 53
Celery Compound (Proprietary)..... 4
Seed..... 1
Extract..... 5
Centaury 2
Cerate, Simple 32
Cerium Oxalate..... 96
Cetraria 2
Chalk, Prepared 20
ChamomillaCompound(Prop.) 10
Chamomile, Oil..... 1
Charcoal 65
Cheken, Fluid Extract 3
Chenopodium..... 1
Oil..... 1
Chinoidine..... 8
Tincture 1
Chionia (Proprietary)..... 4
Chirata, Tincture..... 2
Chloralamide..... 19
Chloral, Camphorated..... 2
Hydrate 355
Chlorodyne..... 17
Chloroform..... 238
Liniment..... 64
Oil 2
Spirit 103
Chloro-phenique 1
Chocolate 1
Cimicifuga..... 5
Extract..... 3
Fluid Extract..... 30
Tincture 46
Cinchona..... 15
Decoction 9
Extract..... 6
Fluid Extract..... 9
Compound..... 1
Infusion..... 3
Syrup, Compound..... 1
Tincture 32
Compound 323
Wine..... 1
Cinchonidine 10
Salicylate 26
Sulphate 107
Cinchonine Salicylate..... 6
Sulphate..... 5
Cinnamon 9
Oil..... 6
Spirit 1
Syrup..... 8
Tincture..... 25
Citronella Oil..... 9
Cleavers, Fluid Extract..... 1
Clover, Red, Extract..... 3
Fluid Extract..... 3
Cloves 1
Oil..... 22
Coca, Extract..... 7
Fluid Extract..... 51
Infusion..... 3
Leaves..... 3
Wine..... 3
Cocaine, Alkaloid 2
Hydrochlorate. ... 305
Oleate 2
Cochineal 2
Codeine, Alkaloid 233
Phosphate 1
Sulphate..... 193
Syrup 2
Cod Liver Oil 40
Cordial (Prop.) . 4
Emulsion 38
Cod Liver Oil, Emulsion (Prop.) with Pancreatin (Prop.) with Phosphates (Prop.) with Pepsin and Quinine (Prop.).. 4 2 7
Tasteless 6
Wine 9
Coffee Syrup 6
Colchicum Root, Extract.... 15
Fluid Ext.. 1
Tincture... 25
Wine. 35
Seed, Fluid Ext.. 1
Powdered. . 1
Tincture... 7
Wine. 126
Colchicine, Alkaloid 1
Collinsonia, Fluid Extract. .. 1
Collodion 19
Cantharidal 1
Styptic 2
Colocynth, Extract 3
Compound... 147
Fluid..... 1
Powdered 1
Cologne Water 7
Conium, Fruit, Extract 11
Fluid Extract... 7
Tincture 1
Leaves, Extract.... 2
Convallaria, Fluid Extract .. 3
Tincture..... 1
Copaiba..... 137
Capsules. 3
Oil 23
Resin. 1
Copper, Acetate, Tincture... 14
Aluminate 4
Arsenite 10
Oleate 1
Oxide. 2
Subacetate 1
Sulphate. 15
Cornsilk, Fluid Extract 13
Corydalis, Fluid Extract 1
Cosmoline..... 12
Camphorated. 14
Carbolated. 6
Cotton, Absorbent..... .. 18
Borated. 9
Cotton Root Bark, Extract... 1
Fluid Ext. 9
Cottonseed Oil..... 1
Cough Syrup (Proprietary).. 1
Crab Orchard Salt..... 1
Cramp Bark, Fluid Extract.. 9
Creolin 38
Creosote, Capsules..... 3
Coal Tar..... 2
Wood Tar 174
Croton Oil 30
Cubeb, Fluid Extract 18
Oil 33
Oleoresin 9
Powdered 17
Syrup..... 1
Tincture. 21
Cudbear, Tincture..... 1
Cumarin. 1
Cundurango, Fluid Extract.. 6
Cuticura Ointment (Prop.) .. 1
Damiana, Fluid Extract 5
Damon's Carminative Prop.) 3
Dental Plaster Proprietary). 1
Dermatina (Proprietary) 2
Dextroquinine..... 1
Diacodia Syrup..... 1
Diastase 13
Digitalin 2
Digitalis 107
Extract 20
Fluid Extract..... 18
Digitalis, Infusion..... .. 73
Normal Liquid 1
Ointment 3
Tincture 437
Dioviburnia (Proprietary)... 11
Diuretin, Proprietary)..... 6
Dogwood 1
Dosimetric Granules..... 5
Duboisine, Alkaloid 1
Sulphate 6
Dulcamara, Fluid Extract... 2
Dulcedo (Proprietary 7
Dyspepsin (Proprietary) 2
Earth, Fuller's 1
Eau de Melisse..... 2
Egg, Yolk..... 14
Elaterium 7
Elaterin..... 1
Elder Flowers 2
Bark, Fluid Extract... 1
Elixir Adjuvans..... 6
Ammonium Valerianate..... 43
Anise 2
Aromatic..... 294
Bismuth 1
and Pepsin..... 14
Iron and Strychnine 1
Pepsin and Strychnine 52
Buchu and Hyoscyamus..... 5
Calisaya 326
and Iron 63
Strychnine ... 6
Bismuth and Iron. 3
Iron and Strychnine . 1
Iron and Strychnine 27
Phosphorized..... 1
Cascara..... 36
Aromatic..... 10
Chloral 4
Chloralamide 1
Coca..... 1
Codeine 17
Cramp Bark..... 1
Compound 5
Curacoa 15
Digestive Ferments (Proprietary) 20
Ducro Proprietary)... 3
Four Chlorides..... 2
Gaultheria 1
Gentian 61
and Phosphate Iron 1
Ferrated 1
Pepsin and Nux Vomica 6
with Tinct. Chloride Iron..... 57
Guarana 8
Hypophosphites 1
Iodo-Bromide Calcium, Compound 14
Iron, Aromatic (Prop) 2
and Quinine..... 2
Peptonate (Prop). 1
Quinine andStrychnine Phosphates. 174
Pyrophosphates.... 3
Quinine andPepsin 7
Lactopeptine Prop ... 127
and Bismuth (Proprietary) ... 31
Hypophosphites (Proprietary 1
Gentian and Iron (Prop). 11
with Phosphates of

Iron, Quinine and Strychnine (Proprietary) ... 25
Elixir Liquorice ... 3
Lithium Citrate ... 1
Mercury, Iron and Arsenic ... 1
Opium, McMunn's ... 7
Paraldehyde ... 4
Pepsin ... 104
and Iron ... 1
Phosphates (Prop.) ... 2
Phosphorus ... 7
Potassium Bromide ... 65
Purgans (Proprietary) ... 3
Rhubarb, Aromatic ... 2
Simple ... 72
Six Iodides (Prop.) ... 1
Sodium Bromide ... 1
Stillingia, Comp'd ... 1
Stomachic ... 1
Sumbul, Comp'd Prop.) 4
Taraxacum, Comp'd ... 19
Tar, Comp'd ... 1
Three Chlorides (Prop.) 21
Yerba Santa ... 14
Elm Bark, Lozenges ... 2
Powdered ... 7
Equisetum Hyemale ... 2
Ergot of Corn, Fluid Extract. 1
Ergot of Rye, Extract ... 24
Fluid Extract . 208
Infusion ... 2
Normal Liquid 20
Oil ... 1
Powdered ... 5
Tincture ... 2
Wine ... 6
Ergotine ... 44
Ergotole (Proprietary) ... 11
Erigeron, Oil ... 9
Escholtzia, Fluid Extract ... 1
Ether ... 51
Acetic ... 9
Nitrous, Spirit ... 425
Spirit ... 4
Comp'd ... 40
Syrup ... 1
Eucalyptol ... 66
Eucalyptus, Fluid Extract ... 11
Oil ... 52
Syrup ... 1
Tincture ... 1
Euphorbia Pilulifera, Fluid Extract ... 5
Euonymin ... 3
Europhen (Proprietary) ... 7
Extracts, Fluid (not named) . 8
Solid (not named) .. 45
Exalgine (Proprietary) ... 15

Febriline (Proprietary) ... 59
Fennel ... 2
Oil ... 2
Ferrum Sanguinis (Prop.) ... 3
Albuminat. Solut. (Frop.) 2
Manganat. Solut. (Prop.) 2
Firwein (Proprietary ... 26
Firnol Compound (Prop.) ... 1
Flaxseed ... 6
Decoction ... 4
Meal ... 17
Foenugreek, Powdered ... 8
Freligh's Tonic (Proprietary) 3
Fringetree, Fluid Extract ... 3
Fuchsine ... 1

Gallobromol (Proprietary) ... 1
Gamboge ... 1
Gargle, Sir Chas. Bell's (Prop.) 1
Goddard's, Astringent (Proprietary) ... 1
Garlic, Syrup ... 12
Gaultheria, Oil ... 130
Spirit ... 25
Syrup ... 5
Gauze, Carbolated ... 5
Corrosive Sublimate . 2
Gelsemin ... 1
Gelsemium, Extract ... 9
Fluid Extract ... 35
Tincture ... 49
Geneva Mineral Water ... 3
Gentian, Extract ... 124
Fluid Extract ... 32
Infusion, Comp'd .. 68
Root ... 24
Tincture ... 20
Comp'd ... 349
Geranium, Extract ... 1
Fluid Extract ... 2
Gin ... 5
Ginger ... 24
Fluid Extract ... 3
Oleoresin ... 1
Syrup ... 271
Tincture ... 45
Glycerin ... 914
Suppositories ... 19
Glycerinum Pepticum (Prop.) 3
Glycerite of Borax ... 1
Boroglycerin ... 6
Camphor and Carbolic Acid. 2
Guaiac ... 1
Tannic Acid ... 52
Glycerole of Hypophosphites. 7
Ferrous Chloride 3
Tar ... 4
Glucidum ... 2
Glycozone (Proprietary) ... 19
Glycyrrhiza ... 35
Extract ... 87
Fluid Extract ... 70
Mixture, Comp'd ... 254
Syrup ... 110
Glymol ... 38
Glyomel ... 1
Goldthread, Infusion ... 2
Gold and Sodium Chloride .. 21
Grains de Saute ... 3
Gravel Plant, Fluid Extract.. 1
Grindelia, Fluid Extract ... 8
Guaiac, Fluid Extract ... 3
Resin ... 2
Tincture ... 20
Ammoniated ... 15
Dewees' ... 1
Troches ... 2
Wood ... 3
Guaiacol ... 28
Carbonate ... 1
Lozenges, Comp'd 4
Guarana, Fluid Extract ... 6
Tincture ... 1

Haarlem Oil ... 1
Haematoxylon, Extract ... 2
Hamamelis, Extract ... 13
Distilled Extract 44
Fluid Extract ... 16
Oil ... 1
Spirit ... 2
Helonias Compound (Prop.) . 1
Fluid Extract ... 4
Hemidesmus, Syrup ... 1
Hemlock Oil ... 4
Plaster ... 2
Hempseed Emulsion ... 2
Hoang Nan, Fluid Extract .. 1
Hobelin, Fluid Extract ... 1
Homatropine, Hydrobromate 23
Honey ... 37
and Borax ... 2
Hops ... 1
Fluid Extract ... 1
Tincture ... 8
Horse Nettle ... 1
Horseradish, Spirit ... 3
Hunyadi Janos Water ... 5
Hydrangea, Fluid Extract ... 2
Lithiated (Prop.) 12
Hydrastis ... 24
Extract ... 1
Fluid Extract ... 76
Colorless, Lloyd's (Prop.) 73
Tincture ... 49
Hydrastin, Resinoid ... 8
Hydrastine, Alkaloid ... 1
Hydrochlorate .. 6
Sulphate ... 4
Hydrogen Dioxide, Solution. 115
Hydroleine (Proprietary) ... 25
Hydronaphthol ... 14
Hyoscyamus, Extract ... 330
Fluid Extract .. 35
Oil ... 8
Powdered ... 8
Syrup ... 2
Tincture ... 194
Hyoscine Hydrobromate ... 7
Hyoscyamine Hydrobromate 3
Sulphate ... 4
Hypno Bromic Compound (Proprietary) ... 1

Iatrol ... 1
Ignatia, Extract ... 9
Fluid Extract ... 3
Tincture 3
Ingluvin (Proprietary ... 108
Inula, Fluid Extract 3
Iodia (Proprietary) ... 13
Iodine ... 24
Liniment ... 1
Ointment ... 9
Compound ... 9
Solution, Compound ... 3
Tincture ... 155
Colorless ... 2
Compound ... 20
Churchill's ... 14
Wine, Compound (Prop.) 1
Iodol ... 33
Iodoform ... 91
Gauze ... 1
Ointment ... 2
Ipecac ... 281
Fluid Extract ... 19
Infusion ... 20
Syrup ... 390
Compound ... 19
Tincture ... 5
and Opium ... 11
Wine ... 105
Iratrol ... 2
Iris Florentina ... 2
Irisin, Resinoid ... 1
Iron, Acetate ... 1
Solution ... 2
Tincture ... 4
and Ammonium Sulph. 3
Tartrate. 1
Albuminate, Solution. 7
Syrup ... 1
Arsenate ... 9
Arsenite ... 4
Bromide, Syrup ... 1
Carbonate ... 25
Mass ... 17
Saccharated ... 13
Precipitated ... 2
Chloride, Syrup (Prop.) 57
Tincture ... 411
Tasteless. 4
Citrate ... 31
and Ammonium Citrate ... 12
Quinine Citrate ... 62
Strychnine Citrate ... 1
Quinine and Strychnine Citrate ... 4
Dialyzed. Solution ... 12
Ferrocyanide ... 2
Iodide, Syrup ... 163
Lactate ... 34

Iron, Malate, Solution 1
Tincture 5
Manganate, Solution.. 1
Nitrate, Solution 1
Oxalate 1
Oxide, Saccharated.... 1
Phosphate 13
Peptonate, Elixir (Proprietary)... 2
Solution..... 5
Potassio Tartrate.. .. 54
Pyrophosphate 60
Reduced..... 150
Subsulphate, Solution. 9
Sulphate 172
Dried..... 70
Valerianate..... 25

Jalap, Abstract 3
Extract..... 4
Powder 13
Compound..... 27
Resin... 12
Tincture 19
Jalapin..... 1
Jamaica Dogwood, Fluid Ext. 3
Jequirity Seed, Infusion..... 1
Juniper Berries..... 13
Fluid Extract... 2
Infusion..... 3
Oil 4
Spirit 14
Compound . 7

Kamala 1
Kava Kava, Fluid Extract .. 22
Kidder's Pastilles 1
Kino, Powdered 3
Tincture 40
Kola Midy (Proprietary) 4
Kousso 3
Krameria, Syrup..... 1
Tincture 19

Lactopeptine (Proprietary).. 241
Liquid 2
Syrup..... 13
Lactucarium 2
Fluid Extract 1
Syrup..... 37
Ladies' Slipper, Fluid Extract. 2
Lanolin 227
Soap..... 1
Lard..... 117
Benzoinated..... 9
Oil 3
Laurel Oil, Expressed 1
Lavender, Fluid Extract 3
Oil..... 6
Tincture, Comp... 111
Laxol 4
Lead Acetate..... 153
Ointment 1
Carbonate 16
Iodide, Ointment..... 6
Nitrate 1
Ointment (Diachylon) . 40
Oleate 1
Plaster 6
Subacetate, Cerate 10
Solution 88
Dilute..... 35
Lemon Juice 6
Oil 5
Spirit..... 14
Syrup 212
Leonorus, Fluid Extract 1
Leptandra, Extract 1
Fluid Extract.... 2
Leptandrin, Resinoid 33
Lice Root, Fluid Extract.... 1
Lime Juice..... 1
and Pepsin..... 1
Syrup..... 1
Water..... 196
Linonin 1

Linseed Oil..... 26
Liquid Bread (Proprietary).. 1
Lippia Mexicana, Fluid Ext. 2
Liquor Carbonis Detergens.. 4
Sedans (Proprietary). 45
Listerine (Proprietary 147
Lithia Tablets, Comp'd. (Prop) 9
Lithiated Potash, Effervescent. 9
Hydrangea (Prop).. 14
Lithium Benzoate..... 31
Bromide 6
Carbonate..... 11
Citrate 12
Granular Effervescent 5
Iodide 2
Salicylate..... 11
Lobelia, Fluid Extract 7
Tincture 38
London Beef Essence (Prop). 1
Lotio Flava..... 1
Nigra 13
Sulphuris 3
Lupulin..... 3
Fluid Extract..... 9
Tincture 12
Lycopodium..... 7
Lysol 1

Magnesia 26
Milk..... 2
Magnesium Borocitrate 1
Carbonate 27
Citrate, Granular 8
Solution 49
Phosphate 3
Sulphate 163
Male Fern, Extract..... 1
Fluid Extract... 1
Oleoresin 5
Malt, Extract..... 34
and Cod-liver oil .. 11
Hypophosphites 1
Pepsin..... 7
Hoff's 8
Sundry Proprietary 14
Fluid Extract..... 3
Malted Milk (Proprietary) .. 5
Maltine Preparations (Prop.) 56
Malto-Yerbine (Proprietary). 4
Manaca, Fluid Extract..... 2
Manganese, Dioxide 17
Sulphate 1
Manna..... 3
Syrup 2
Matico, Fluid Extract..... 2
Infusion..... 1
Mellin's Food (Proprietary).. 1
Menthol 124
Plaster 1
Powder, Comp'd..... 1
Mercury, Ammoniated..... 34
Ointment 7
Chloride, Corrosive 348
Mild 1195
Ointment 1
Cyanide 1
Iodide, Red..... 46
Ointment 3
Yellow ... 81
Mass..... 214
Nitrate, Ointment. 44
Ointment 76
Oleate..... 35
with Morphine 10
Oxide, Red..... 15
Yellow 46
Ointment 21
Plaster 3
Salicylate..... 5
Subsulphate, Yellow 1
Tannate 1
Thymol-Acetate .. 1
with Chalk..... 59
Methylene Blue 1
Methyl Violet 1

Mettauer's Aperient 1
Mezereon 1
Milk 1
Mixture, Almond 6
Ammonium Chloride 1
Asafetida 1
Basham's 85
Camphor, Parrish's. 1
Chalk 204
Cholera, Sun 6
Creosote (Prop.)... 1
Guaiac and Stillingia (Proprietary) 1
Gummosa 2
Helonias Comp'd (Proprietary 3
Iron and Ammonium Citrate 1
Compound..... 11
Magnesium and Asafetida 3
Potassium Chlorate. 4
Citrate 14
Quinine 1
Rhubarb and Soda . 5
Soda 4
Taraxacum Comp'd. 58
Morphine, Acetate..... 77
Bimeconate, Solution 5
Bromide..... 2
Hydrochlorate... 34
Oleate..... 8
Sulphate 1048
Solution 2
Magendie 6
Syrup, Comp'd... 11
Mullein 4
Fluid Extract..... 2
Oil 2
Musk 1
Tincture 2
Mustang Liniment (Prop.).. 1
Mustard 3
Oil 4
Plaster 1
Myro-Petroleum (Prop.)..... 2
Myrrh 8
Tincture 64
Myrrh and Capsicum, Tinct 3

Naphtalene..... 9
Naphtol..... 22
Natrolithic Salt..... 1
Nitroglycerin, Spirit 39
Nutgall 7
Ointment..... 10
Compound 1
Syrup, Aromatic..... 1
Tincture 3
Nutmeg 2
Oil 1
Spirit..... 3
Nux Vomica 22
Extract 477
Fluid Extract..... 12
Tincture 910

Oats, Fluid Extract..... 1
Tincture, Concentrated 8
Œnothera, Fluid Extract.... 8
Ointment, Dermatol 1
Simple 64
Taroid 1
Vinolia..... 1
Olibanum 4
Olive Oil..... 94
Opium 326
Extract 110
Fluid Extract..... 3
Liniment 21
Ointment..... 1
Solution, Compound 1
Sedative, Battley's.. 13
Tincture 340
Acetated 2

Opium, Tinct. Camphorated.. 650
Compound.... 1
Crocated 12
Deodorized... 284
Vinegar 1
Wine 24
Ophthalmic Disks 12
Orange Oil..... 10
Spirit 10
Syrup..... 462
Tincture 9
Orange Flowers, Oil 3
Syrup 45
Origanum 12
Orris Root 1
Oxgall, Inspissated 8

Palmetto, Fluid Extract..... 6
Pancrea Bismuth (Prop.).... 4
Pancreas, Essence..... 2
Extract 17
Pancreatic Solution..... 2
Pancreatin 47
Pancreobilin (Prop.) 1
Panopeptone (Proprietary).. 49
Papaine 5
Papine (Proprietary)..... 10
Papoid (Proprietary)..... 97
Paraffin 1
Paraldehyde..... 4
Pareira Brava, Infusion..... 2
Parsley Seed, Fluid Extract. 4
Paste, Lassar's 11
Pasteurine..... 2
Pennyroyal, Fluid Extract... 1
Pepper, Black..... 13
Oil 29
Peppermint Oil..... 51
Oil Sugar..... 6
Spirit..... 43
Pepsin, Cordial (Prop.)..... 5
Elixir..... 3
Essence..... 388
Glycerole 51
Pure, U. S. P..... 362
(Proprietary).. 29
Saccharated..... 121
Solution..... 17
Aromatica 1
Wine 17
Peptenzyme, Elixir..... 22
Peptic Essence Proprietary). 3
Peptogenic Milk Powder (Proprietary) 1
Peptomanganese (Prop.)..... 74
Peptones, Liquid (Prop.)..... 2
Peptonizing Powders..... 7
Pepto-tonique (Proprietary).. 3
Petrolatum 104
Carbolized..... 1
Emulsion..... 5
Liquid 4
White..... 3
Phenacetine 775
Phenocoll Hydrochlorate.... 3
Phospho-Caffeine, Compound (Proprietary)..... 4
-Chlorides (Prop.).. 3
-Glycerin Tonic (Pr.) 3
Phosphorus..... 3
Resin 4
Physostigma, Extract..... 2
Fluid Extract..... 4
Tincture 1
Physostigmine, Salicylate.... 2
Sulphate..... 10
Phytolacca, Extract..... 12
Fluid Extract..... 19
Tincture..... 15
Phytoline 1
Pichi, Fluid Extract..... 11
Tincture 1
Picrotoxin 3
Pilocarpus, Extract..... 1
Fluid Extract... 33
Tincture 5

Pilocarpine..... 6
Hydrochlorate..... 52
Pills, Aloes and Iron 1
Mastiche.... 5
Myrrh 4
Aloin, Compound 2
Belladonna and Strychnine..... 68
Strychnine and Cascara..... 1
Ammonium Sulphate, Compound 2
Anticonstipation 16
Aphrodisiac..... 2
Aromatic, Compound.. 2
Arsenic, Iodide..... 2
Sulphide..... 1
Asafetida..... 6
and Nux Vomica.. 5
Atropine..... 2
Blaud's 31
Calcium Sulphide..... 18
Cascara Extract..... 3
Cascarin, Compound.. 3
Cathartic, Cascara.... 1
Compound..... 81
Improved..... 4
Vegetable..... 3
Cephalic 1
Chalybeate, Compound 4
Charcoal 1
Cinchonidine Salicylate 4
Codeine 5
Colocynth, Compound. 9
Creosote..... 7
Cystillis, Compound... 1
Emmenagogue..... 12
Ergotine..... 33
Compound..... 2
Euonymin..... 3
Febricide..... 2
Gold and Sodium Chloride 1
Harnot 1
Helonias Comp'd 1
Hepatic 2
Hooper's 1
Hypophosphites Comp. with Strychnine 2
Ichthyol 11
Iodoform and Iron 1
Iron, Carbonate 21
Iodide 5
Lactate, Comp'd. 1
Phosphate 1
Phosphorus and Nux Vomica .. 1
Phosphorus and Strychnine.... 1
Protochloride (Rabuteau).... 1
Quinine and Strychnine Phosphates ... 3
Quinine and Zinc Valerianates... 2
Reduced 2
Sulphate..... 6
Lapactic (Proprietary). 21
Laxative 4
Manganese Dioxide... 5
Mercury, Mass..... 43
Chloride, Corrosive 1
Chloride, Mild 1
Chloride and Opium 1
Protoiodide.. 47
Morphine, Sulphate... 12
Mousette's 2
Neuralgic (Brown Sequard)... 9
(Gross) ... 1
Nitroglycerin..... 2
Opium 2
and Camphor 2

Pills, Opium and Lead Acetate. 1
Papoid and Soda (Prop.) 8
Pepsin, Bismuth and Pancreatin 2
Peptonic (Proprietary) 9
Phenacetine 11
and Salol 13
Phenyo-Caffeine Prop.) 1
Phosphorus 1
and Damiana 2
Compound 3
Podophyllin 3
Quinine and Capsicum 1
Pepsin .. 2
Bisulphate ... 3
Salicylate 1
Comp'd .. 1
Sulphate 86
Phosphorus, Iron and Nux Vomica ... 1
Rhubarb, Comp'd 18
Salicylic Acid 2
Salol 4
and Rhubarb 8
Sequin 5
Squill, Comp'd..... 1
Strychnine 41
Sumbul, Comp'd..... 10
Tannic Acid..... 2
Tar 1
Terpin Hydrate 2
Tonic, Aitken's 1
Warburg's Tincture .. 7
Pimpinella, Tincture..... 2
Pine Needles, Fluid Extract. 2
Oil 1
Pinus Canadensis, Extract (Proprietary) 24
Sylvestris, Oil..... 2
Piperazine..... 9
Piperin 37
Plaster, Adhesive..... 3
Galbanum..... 1
Pitch 5
with Cantharides 1
Plasters, Allcock's (Prop.).. 1
Bellcapsic Prop.).. 3
Platt's Chlorides (Prop.).... 3
Podophyllum, Extract..... 2
Fluid Extract.. 8
Tincture 1
Podophyllin, Resinoid 199
Pomegranate Bark..... 1
Ponca Tablets (Proprietary). 1
Poppy Capsules 1
Syrup 5
Potassa, Solution..... 51
Potassium Acetate..... 208
Solution. 5
Arsenite, Solution 18
Bicarbonate 118
Gran. Efferv. 2
Bichromate.. 1
Bitartrate 56
Bromide..... 646
Carbonate. 73
Chlorate..... 406
Chloride..... 2
Citrate 161
Solution. 66
Cyanide. 6
Iodide. 746
Ointment. ... 9
Nitrate 73
Permanganate ... 29
Phosphate. 1
Salicylate 1
Sodium Tartrate . 48
Sulphate 4
Sulphide 6
Powder, Aloes and Canella.. 6
Antiseptic, Comp'd. 7
Aromatic. 58
Chalk, Aromatic. .. 1
Comp'd 16

Powder, Diaphoretic, King's. 8
Digestive, Comp'd.. 6
Dover's 276
Headache (Prop.).. 1
Jalap, Comp'd. 9
Kino, Comp'd..... 1
Liquorice, Comp'd.. 61
Rhubarb, Comp'd.. 5
and Magnesia.. 1
Seidlitz..... 6
Soda 1
Tully's 4
Protinol. 2
Pulsatilla, Fluid Extract 2
Pellets (Homeop.) 3
Tincture. 8
Pumpkin Seed..... 2
Pyoktanin, Yellow..... 1
Pyretine 7
Pyrozone 2

Quassia. 1
Extract 4
Fluid Extract 1
Infusion 11
Tincture. 10
Quinia, La Roche 6
Quince Seed, Mucilage..... 3
Quinine, Alkaloid 11
Bisulphate 86
Hydrobromate 6
Hydrochlorate 108
Oleate 1
Phosphate 1
Salicylate 25
Sulphate 1657
Tannate 3
Valerianate..... 35
Quinimel (Proprietary) 14
Quinona..... 2

Raspberry Syrup 64
Red Gum, Fluid Extract 10
Lozenges (Prop.). 2
Resin, Cerate..... 54
Compound..... 2
Ointment..... 3
Resorcin..... 141
Rose, Confection 3
Honey..... 1
Oil..... 14
Syrup..... 2
Water Ointment 128
Rose Geranium, Oil..... 3
Rosemary, Fluid Extract.... 7
Oil 5
Spirit..... 2
Rhigoline 1
Rhubarb 224
and Soda Mixture..... 17
Extract..... 28
Fluid Extract..... 7
Infusion..... 2
Syrup..... 74
Aromatic 95
Tincture..... 43
Aqueous 3
Aromatic..... 5
Rhus Aromatic..... 1
Tahac..... 1
Toxicodendron, Fl. Ext. 2
Rubidium Iodide 4
Rubinat Condal Water..... 1
Rue, Oil 10
Rum, Jamaica..... 4
New England..... 3
Rumex, Fluid Extract 2
Rusci Oil 7

Saccharin 6
Solution (Nat. Form.) .. 4
Sage 10
Fluid Extract..... 2
Oil..... 1
Saffron 1
Syrup..... 5
Saffron, Tincture 2
Salicin..... 67
Salipyrin 2
Salix, Bark..... 1
Tincture..... 3
Salol 381
Capsules 5
Salophen 58
Sandalwood, Oil..... 48
Sanguinaria 4
Fluid Extract..... 2
Syrup.. 1
Tincture 27
Sanmetto Proprietary)..... 26
Santal Midy (Proprietary)... 6
Santonin 40
Sarsaparilla, Decoction, Compound..... 2
Fluid Extract... 6
Compound.... 2
Infusion..... 2
Syrup 3
Compound.. 248
Sassafras..... 1
Oil 10
Pith, Mucilage 5
Syrup..... 6
Savin Oil 14
Scammony Resin..... 3
Seltzer Aperient (Prop.)..... 8
Senega, Decoction..... 1
Fluid Extract..... 126
Infusion..... 5
Syrup..... 126
Tincture 1
Senna 3
Confection 2
Fluid Extract..... 30
Infusion..... 8
Syrup..... 9
Serpentaria, Fluid Extract .. 4
Infusion..... 1
Tincture..... 15
Silver Nitrate..... 99
Oxide 1
Simaruba Bark 8
Soap Bark 1
Decoction..... 2
Benzoinated..... 1
Corrosive Sublimate... 1
Green 34
Hard 17
Liniment 149
Plaster 1
Salicylated..... 3
Sarg's Liquid 1
Sulphur 1
Tincture..... 7
Sodium Arsenate, Solution.. 5
Arsenite 10
Benzoate 123
Biborate..... 130
Bicarbonate 582
Bisulphite 2
Bromide..... 456
Bromate..... 1
Carbonate 5
Dried 2
Chlorate..... 1
Chloride 66
Hypophosphite 3
Hyposulphite..... 12
Iodide 66
Nitrate..... 26
Phosphate..... 71
Granular Efferv. 1
with Salicylic Acid .. 2
Salicylate 592
Granular Efferv. 5
Succinate 3
Sulphate 133
Sulphide 3
Sulphite..... 11
Sulphocarbolate..... 8
Soda, Chlorinated, Solution . 6
Soda Mint 5
Solution, Ammonia Anisated. 22
Benedictine 3
Burrow's..... 14
Coleman's 1
Dobell's..... 48
Donovan's..... 25
Fowler's..... 312
Gold and Arsenic Bromide 10
Gold, Arsenic and Mercury..... 1
Hypophosphites ... 1
Lappa Compound (Proprietary) 1
Lead and Opium... 1
PicineComp. (Prop). 1
Vleminck's 1
Somatose 3
Sparteine Sulphate..... 5
Spearmint, Oil..... 1
Spirit 4
Species Pectoralis, Infusion.. 1
Spencer's Chloramine Tablets 1
Spigelia, Fluid Extract..... 2
Tincture 1
and Senna, Fluid Ex. 3
Syrup ... 1
Spike Oil 2
Spirit of Myrcia 31
Sprudel Salts, Carlsbad 2
Squill 20
Fluid Extract..... 145
Compound 1
Syrup..... 284
Compound 127
Tincture 11
Vinegar 3
Starch 118
Stavesacre, Fluid Extract ... 1
Tincture 1
Stillingia, Fluid Extract 4
Comp'd 2
Syrup, Comp'd ... 12
Tincture 1
Stokes' Liniment..... 2
Stramonium, Extract..... 6
Fluid Extract.. 2
Ointment..... 17
Tincture 1
Strontium Bromide 33
Solution (Prop.) 2
Iodide..... 3
Lactate 3
Strophanthus, Tincture 119
Strychnine, Alkaloid..... 75
Arsenate 4
Nitrate 9
Phosphate..... 4
Sulphate..... 687
Styrax, Liquid..... 6
Succus Alterans (Prop.) 13
Glycyrrhizæ 4
Sugar 505
Lemon 2
Milk 207
Sulphonal 161
Sulphonaphtol..... 7
Sulphur..... 59
Iodide..... 3
Ointment 17
Alkaline..... 1
Precipitated 67
Sumac 3
Decoction 1
Sumbul, Extract..... 12
Fluid Extract..... 1
Syrup 1
Tincture 11
Suppositories..... 42
Gluten 1
Svapnia (Proprietary) 1
Syrup, Ammonium Phenate (Prop.)..... 1
Dover's Powder 2
Hypophos., Comp'd . 169

Syrup, Hypophos., Fellows' .. 118
McArthur's 23
Metcalf's.. 5
with Iron . 34
Pectoral, Comp'd (Prop.) 7
Phosphates, Comp'd. 13
Phosphates of Iron, Quinine and Strychnine 12
Phosphate Manganese Comp'd Prop.) ... 13
Phospho-Muriate Quinine, Comp'd Prop.) 40
Roborans 44
Senna and Manna .. 8
Simple 672
Trifolium, Comp'd .. 35
Tablets, Acetanilid Comp'd.. 4
Alkaline Antiseptic (Seiler) 49
Aloin, Belladonnaand Strychnine 13
Aloin, Belladonna and Ipecac 5
Apomorphine 1
Atropine Sulphate .. 1
Bismuth and Pepsin. 9
Pepsin and Pancreatin 1
Calcium Sulphide ... 4
Charcoal, Blue Mass and Sodium Bicarbonate 1
Cocaine and Cubeb . 1
Comp'd 1
Corrosive Sublimate. 31
Four Chlorides 3
Freligh's Cough 1
Helonias Comp'd (Prop. 1
Iron, Quinine and Strychnine 6
Iron, Quinine and Arsenic 6
Lithia Comp. Prop.) 17
Magnesium Sulphate 1
Morphine 3
and Atropine. .. 1
Nitroglycerin 3
Ox Gall, Comp'd ... 7
Pepsin & Pancreatin. 1
Ponca Comp. (Prop.) 14
Potassium Permanganate 3
Quinine & Chocolate 3
Rhinitis..... ... 1
Salol and Antikamnia 9
Strychnine. 1
Sulphur, Comp'd ... 2
Theine..... 1
Therapine (Prop.).. 6
Thyroid (Prop.) 4
Tonic, Alterative. .. 2
Aitkens. 1
Hypophos... 2
Phillips 2
Viburnum, Comp'd.. 1
Talcum 7
Tapioca. 1
Tar. 9
Oil 13
Ointment 22
Syrup..... 25
Wine 9
Taraxacum 1
Extract 62
Fluid Extract 43
Tartarus Boraxatus. 1
Terebene 17
Terpin Hydrate 63
Terraline Proprietary) 22
Thallium Sulphate..... 3
Thapsia Plaster 2
Thiol 19
Thuja, Fluid Extract 3
Thymol. 23
Iodide 3
Thyroids, Exsiccated (Prop.) 14
Tincture, Aromatic. 1
Bitter. 8
Tobacco 3
Tongaline (Proprietary). 7
Tolu Balsam 4
Syrup 991
Tincture..... 1
Tragacanth..... 11
Triferment Proprietary)..... 2
Trillium, Fluid Extract..... 1
Trional 18
Triticum 7
Fluid Extract..... 10
Infusion..... 7
Troches, Brown's (Prop.)..... 1
Turpentine 3
Canada 1
Liniment. 2
Oil 125

Unguentum, Wilkinson (Proprietary)..... 3
Wilson (Prop.). 2
Uva Ursi..... 2
Fluid Extract..... 19
Infusion..... 3
Tincture 1

Valerian..... 7
Abstract..... 2
Extract..... 9
Fluid Extract..... 13
Tincture 29
Ammoniated..... 13
Ethereal 5
Vanilla, Syrup..... 1
Tincture 2
Vapo Cresolene (Prop.) 1
Vaseline Proprietary 203
Carbolated Proprietary) 7
White Proprietary 3
Veratrine 1
Ointment. 3
Veratrum Viride Fl. Ext..... 4
Tincture... 26
Normal. 2
Viburnum Prunifolium Ext... 5
Fluid Extract. 45
Syrup..... 1
Tincture 11
Viburnum Compound (Prop.) 62
Vinegar 1
Vinola Cream Proprietary).. 1
Vin Nourry (Proprietary'... 1
Virginia Stone Crop, Fl. Ext. 9
Vitalized Phosphites (Prop.) . 2

Wafer Ash, Fluid Extract..... 12
Tincture..... 1
Wahoo, Fluid Extract 5
Warburg, Extract..... 5
Tincture..... 9
Water 1249
Almond 31
Anise 64
Camphor 240
Caraway..... 8
Water, Chamomile..... 1
Cherry Laurel..... 92
Chloroform..... 40
Cinnamon 230
Cologne..... 7
Dill. 2
Distilled 1696
Elder Flower..... 2
Fennel 27
Gaultheria..... 27
Orange Flower 90
Peppermint..... 620
Rock Bridge Alum..... 2
Roncegno..... 2
Rose..... 175
Spearmint 21
Vichy..... 4
Wax, White..... 2
Wheat Phosphates (Prop)... 20
Whiskey 104
White Oak, Infusion..... 3
Physic 1
Pinus Canadensis (Proprietary) 1
Fine Syrup, Comp'd.. 60
Wild Cherry Bark 4
Fluid Extract.. 29
Infusion 1
Syrup 638
Wine 2
Wild Turnip, Fluid Extract . 1
Yam, Fluid Extract.... 1
Wine, Aromatic 2
Beef and Iron 6
Coca (Proprietary).... 40
Cognac 2
Digestive Proprietary) 1
Durand's..... 2
Iron, Bitter..... 19
Citrate 2
Port 11
Quinine..... 2
Quinquina Prop)..... 1
Sherry 28
Wormwood 2
Fluid Extract..... 27
Infusion 4
Oil..... 3

Xanthoxylum, Fluid Extract. 4
Tincture 1

Yerba Santa, Fluid Extract.. 9
Syrup..... 13
Aromatic.. 104
Yerbazine (Proprietary). 2

Zinc Acetate 18
Bromide 7
Carbonate..... 12
Chloride 15
Iodide 1
Oleate 46
Oxide..... 210
Ointment 212
Comp'd. 1
Permanganate. 3
Phosphide..... 21
Sozoiodol 2
Stearate 5
Ointment 3
with Boric Acid 2
Peru Bals. 2
Sulphate 296
Sulphocarbolate.... ... 61
Valerianate..... 34
Zymocise (Proprietary)..... 4

SUMMARY.

Number of prescriptions. 27000
Number of preparations called for. 7735
Number of times used 69693

MR. HALLBERG: We have 25,000 tabulated prescriptions from various portions of the

State of Illinois, and if it should be deemed desirable we would be glad to add that collection to this one, and if other State Associations would do the same thing we would get quite a record; we would have at least 100,000 or more, and if we could get a million prescriptions by 1900, we would know where we stand. I would like to say one thing and that is that the term "prescription analysis" is misleading. We used that ten years ago—that is, Mr. Ebert did, and we afterward adopted the term "prescription statistics." It is not properly an analysis, pharmaceutically speaking.

MR. CASPARI: I would like to ask, in referring this paper to the Publication Committee, if it is intended to publish the whole book that goes with it? As a member of the Publication Committee I ask for information. The paper which Prof. Remington read to-night gives a large amount of tabulated matter which probably conveys all the essential information. If we are to publish the book also, it will be a little volume in itself.

DR. DOHME: I would simply state that this book contains the name of each article that was prescribed in the whole list of 27,000 prescriptions, as also the number of times it was prescribed, and from this book Prof. Patch drew his conclusions and presented them in his paper.

MR. GOOD: It seems to me that that book contains the information we want, rather than the number of times prescriptions were reported for pills, plasters, powders, etc. That is simply the form in which the drugs were dispensed, and we are not nearly so much interested in that as we are in the articles contained in those pills, powders, etc.

MR. HALLBERG: We consolidated the 1885 and 1886 report in Illinois, and it did not take up more than 12 to 16 pages of our State report in detail, just exactly as you have it in that report. If it is properly and alphabetically arranged, it will not take near as much space as you think.

MR. REMINGTON: I did not read one-tenth of the paper. I think all that Professor Patch intended to be published is the paper, and not the book. I move to refer the whole matter to the Committee on Publication.

MR. PRESCOTT: I am quite sure that the editors will put these papers in proper form for publication, as regards detail and summary; but I would like to say that it seems to me that these statistics are of very great value in permanent form, where they may be consulted. There are various and numerous uses for them. Physicians and medical authorities might draw upon them to great advantage; the next Committee on Revision of the Pharmacopœia will have occasion to use them with profit. Very many times such questions as the use of proprietary medicines can be settled by such statistics. They are of very great value, and should be of permanent form in the record.

MR. HALLBERG: I would ask that the Committee on Publication consult with Mr. Ebert, because he inaugurated this work here, and could indicate a very simple way in which this can be printed without taking up very much space.

MR. CASPARI: It is all arranged alphabetically, and the Committee is perfectly willing to print it, but we would like to have authority to print it. All of these things are at the expense of the Proceedings, and we are now on a tack of retrenchment. If we publish this and add to the cost of the volume, we would like to be able to say that the Scientific Section ordered it. We will do it, if the Scientific Section orders it.

MR. RYAN: I would ask if the paper does not cover exactly the statements that are given in the book accompanying it?

MR. CASPARI: Yes, sir, in summary, but it does not itemize them.

MR. REMINGTON: It is very expensive to publish tabulated matter, but I know that a very valuable abstract of the book can be published when the Publication Committee comes to look at it, and I do hope that none of the interesting points which are here will be abstracted; that is, I hope it will not be cut down so as not to be useful. I think the membership of the American Pharmaceutical Association want that very information, and I would not like to see it injured in that way. I would like to say that any of the material which the Publication Committee has which they are not going to use, if they will turn it over to the Chairman of the Revision Committee, Dr. Rice, he would be very glad to receive it.

MR. GOOD: In regard to the offer of Professor Hallberg, on the point of economy it seems to me that we ought not to undertake to publish any more than Professor Patch has offered. And another question occurs to me: Can we properly accept anything other than what is originally presented before this Association? Is it consistent for us to accept reports from State associations and publish them in our Proceedings?

MR. REMINGTON: I think not. Professor Patch has collected this from all over the country, and offers it as a part of our record.

MR. GOOD: I remember on one occasion when Professor Maisch came out very emphatically, "Has that paper been read before?" "Yes, sir." "It does not belong to the American Pharmaceutical Association then." Do not understand me that I am objecting. I simply raise the question. I am heartily in favor of taking that and adding to it, but I want to be careful in establishing a precedent. In accepting papers from a State association will it always be by a special vote?

MR. HALLBERG: The value of a publication of that kind is in this: With these copies printed in extenso, if there are a hundred copies struck off and these copies are furnished next year to those who desire to contribute to this collection, it will very greatly facilitate the work. This work is very difficult, and if each pharmacist has a copy of this table before him with every item alphabetically arranged, all he has to do then is simply to make his check mark on each item as it occurs in his prescriptions; he does not have to write down the name of every article. The additional cost of our table added to this would be nothing, because the number of each article in our list could be added to the number in Professor Patch's in the same column, and they would simply be added to the item already printed of these 50,000 prescriptions. There will not be more than about 700 items, and estimating fifty items on each page, it will only take fourteen pages. If our State association could afford to print a report like that for two years in succession, it seems to me that the American Pharmaceutical Association ought to be able to do it.

MR. GOOD: I think the whole matter can be left to the Publication Committee. I move that the papers from the Illinois State association be received.

THE CHAIRMAN: Shall we not make any request for similar statistics from other Associations?

MR. REMINGTON: Yes, I move that any other State association that has similar statistics, be requested to furnish them to this Association for addition to the statistics; it will not add another page to the report.

The Chairman then put the motion as amended, that the offer of the State association of Illinois be accepted, and such other associations as are in a position to furnish matter in this line, and the same was adopted.

The following papers were then read by title and referred to the Publication Committee:

(The text of these papers, together with that of others read by title, will appear in full at the end of the minutes of this Session.)

The Extracts of Cod Liver Oil, by F. E. Stewart.

Cod Liver Oil, by C. C. Sherrard.

On Chinquapins, by Henry Kraemer.

Analysis of Kola, by J. O. Schlotterbeck and James W. Knox.

Laboratory Notes on Pepsin, Coca Leaves, etc., by L. B. Kebler.

THE CHAIRMAN: There being no other committees to report, the next thing on the programme is the installation of officers. As Professor Sadtler does not seem to be here, I would like to ask Mr. Ryan why he is not present.

MR. RYAN: Professor Sadtler is stopping with a brother at Golden. He asked me to state that it is absolutely necessary that he go there this evening, and that he would not be able to be present at the last session. Consequently, I would make a motion that the present Chairman continue until the adjournment of this Section.

The Chair appointed Messrs. Williams and Ryan to escort the new Secretary, Mr. W. C. Alpers, to the platform. Mr. Alpers, being introduced to the Section, was received with applause, and spoke as follows:

I fully appreciate the honor that you confer upon me by electing me your Secretary, but if I do not come up to your expectations, do not forget that I told you before you elected me that I am a very busy man. I shall do my best to exercise in the right direction any power that is given me with this office. I shall endeavor to throw out all the papers in the future the digestion of which requires a stronger pepsin than my own constitution contains, so that we shall need no calomel. I shall also see that no paper will occupy more than fifteen minutes in its reading, except in the case of our Colorado friends, where I shall make it 1 to 16. (Applause.)

There being no new business to come before the Section, the minutes of the session were read and approved as read, and upon motion, the Section finally adjourned until the next annual meeting of the American Pharmaceutical Association.

CUCURBITA FŒTIDISSIMA, AND IPOMEA LEPTOPHYLLA,

BY LUCIUS E. SAYRE.

These two enormous succulent roots are found in western Kansas in dry and sandy soil. In some parts of the state where irrigation is carried on, the roots are found to be quite a nuisance, as it is difficult to remove them from the ground.

One of these, Cucurbita fœtidissima, was shown to members of this Association at its meeting in Asheville, at which time it was stated that an analysis would be made in the course of the year. For assistance in this analysis I am indebted to Mr. Wm. H. Lang. The analysis of the Cucurbita fœtidissima is as follows:

FIG. 15.

Cucurbita fœtidissima.

I. Ash ..... .093 per cent.
   1. Soluble in water..... .026 per cent.
   2. Soluble in hydrochloric acid..... .032 "
   3. Soluble in sodic hydrate ..... .012 "
   4. Insoluble..... .023 "

II. Inorganic Constituents,
   1. Phosphoric acid.
   2. Carbonic acid.
   3. Iron.
   4. Calcium.
   5. Potassium.
   6. Sodium.

III. Chloroformic Ext..... 6.14 per cent.
a. Volatile oil..... 1.28 per cent.
b. Fixed oil..... 1.93 "
c. Resin..... 1.50 "
d. Waxy matter, brown; very bitter.. 1.43 "
IV. Alcoholic Ext. (80 per cent.).....13.20 per cent.
a. Precipitated resin..... 3.16 per cent.
b. Organic acid and allied products.. 2.91 "
c. Glucose, none.
d. Extract cont. alkaloid..... 7.93 "
V. Aqueous Ext., Tasteless brown insoluble in alcohol..12.02 per cent.
a. Gum, none.
b. Colloidal Ext. and albumin.....11.83 per cent.
VI. Acidulated Aqueous Ext., brown; bitter acrid taste, etc.....36.00 per cent.
a. Inert coloring matter.....21.65 per cent.
b. Starch and allied substances.....14.21 "
VII. Sodium Hydrate Ext..... 21.51 per cent.
VIII. Cellulose..... 10.06 "
IX. Moisture..... 8.70 "

Total..... 107.723

By qualitive test an alkaloid in very small quantity was found present, but this was not separated.

The volatile oil from the chloroformic extract was of a brownish-yellow color, very bitter; slight odor, and was easily saponfied.

The waxy matter found was of a brown color, and also had a very bitter taste. There was not a great deal of resin found, but what was found was dark, and when rubbed gave a peculiar resinous odor.

IPOMEA LEPTOPHYLLA.

This root resembles the foregoing very much. It is commonly known as the "Wild Morning Glory." It is a beautiful plant with a bushy head, bearing numerous large purple flowers, closely resembling those of the common cultivated morning glory of the gardens; the stems being numerous, branching, rarely attaining a height of a couple feet, but the root is also enormous, often approaching the size of the wild pumpkin. The roots of the wild pumpkin have been found of about seven feet in length and of proportional diameter. This root (the ipomea) is very difficult to powder, being very fibrous, and when in the powdered form has a very characteristic odor, yellowish color and intensely bitter taste; inhaled it produces sneezing. An examination similar to that of the wild pumpkin was made, and is here given:

I. Ash.....3.080 per cent.
1. Soluble in water.....0.92 per cent.
2. Soluble in hydrochloric acid.....1.62 "
3. Soluble in sodic hydrate..... .43 "
4. Insoluble..... .105 "

II. Inorganic Constituents.
1. Phosphoric acid.
2. Carbonic acid.
3. Iron } very.
4. Calcium } prominent.
5. Potassium.
6. Sodium.

III. Chloroformic Extract ..... 8.90 per cent.
a. Volatile oil. None.
b. Fixed oil. None.
c. Resin (yellowish-brown, resinous odor and taste) ..... 6.38 per cent.
d. Waxy matter (gray color, odorless and bitter) ..... 2.62 per cent.

IV. Alcoholic Ext. (80 per cent.) ..... 10.80 per cent.
a. Precipitated resin ..... 2.94 per cent.
b. Organic acids and allied products. 4.28 "
c. Glucose. ..... none.
d. Ext. cont. alkaloid ..... 3.52 "

V. Aqueous Ext. (tasteless, brown,) insol. in alcohol ... 14.50 per cent.
a. Gum ..... 5.81 "
b. Colloidal ext. and albumin ..... 8.64 "

VI. Acidulated (H_2SO_4) Ext. (brown) ..... 22.57 "
a. Inert coloring matter (brown and odorless) ..... 10.52 per cent.
b. Starch and allied substances ..... 12.05 "

VII. Sodic Hydrate Ext ..... 21.94 per cent.
VIII. Cellulose ..... 18.85 "
IX. Moisture ..... 9.2 "

Total 109.84

The resin from the chloroformic extract was of a yellowish brown color.

The waxy matter was found of a dirty-gray color, odorless and of slight bitter taste.

THE SPLEEN—A DIGESTIVE ORGAN.

BY E. E. STUART AND L. E. SAYRE.

New preparations are being continually placed upon the drug market, which, after strict trial and due examination, are classified according to their especial merits to be employed by physicians as panaceas for the various ills that afflict mankind.

One of the most recent of these is represented as being manufactured from the spleen.

Heretofore, the spleen has been considered an organ of doubtful utility to the life of mankind, and has been classified by some physiologists as the graveyard of the blood corpuscles, while others have suggested that it might have something to do with the process of digestion; but not until recently has it been demonstrated that the spleen furnishes a principle

which has powerful proteolytic action. This principle is alleged to have been isolated and presented to the profession as a therapeutic agent containing all the active and inactive digestive principles present in the combined glandular secretions of our seven digestive organs.

According to the analyses of several chemists a number of the more highly oxidized stages of albuminous bodies have been found to exist in the spleen. Besides the ordinary constituents of the blood there exist: leucin, tyrosin, xanthin, succinic and uric acids, together with hypoxanthin, lactic, butyric, acetic, and formic acids, and perhaps glycero-phosphoric acid, cholesterin, a gluten-like body inosit, a pigment containing iron, and even free oxide of iron. The ash is rich in phosphoric acid and iron, poor in chlorine compounds; the splenic juice is alkaline in reaction.

The spleen has a peculiar circulation, which is not due to the blood pressure within the arteries, but is carried on chiefly by a rhythmical contraction and dilation, which, although modified, continues after section of the splenic nerves, indicating that the spleen has an independent mechanism within itself causing its movements. It is during these hours of rhythmical movements of the blood in the spleen that the cells may impart their contents to the circulation by transudation.

The relations which exist between the spleen and the liver are regarded as corroborative of their co-operation in the scheme of digestion. After a meal the spleen increases in size, and it is usually largest about five hours after digestion has begun, and after a time regains its normal volume. One writer thinks it probable that some of the products of digestion are partially acted upon in the spleen and undergo further changes in the liver; and another writer says there is further evidence of the relations between the spleen and liver in that when the spleen is stimulated to contract, the liver becomes enlarged, as if injected by the back flow of the blood pressed out of the spleen.

Our experiments have been performed with the main idea of ascertaining whether the spleen does, or does not, contain a digestive agent. With this object in view we first made an organic analysis of the spleen of a beef, following the usual method,* with the following results:

Moisture	73.25 per cent.
Organic matter	27.73 per cent.
Inorganic constituents	1.86 per cent.
	102.84 per cent.

Organic matter was composed of:

Fats	2.27 per cent.
Extracts and soluble salts:	
Alcoholic	.882 per cent.

* See Manual of Chemistry, Simon, p. 430.

Aqueous	3.150 per cent.
Albuminoids	19.820 per cent.
Insoluble salts	.900 per cent.
	27.022 per cent.
Soluble inorganic compounds	.96 per cent.

We also found present chlorine and iron.

The fats melted at a low temperature, and possessed a very strong, peculiar and disagreeable odor.

Securing a sample of pure extract of spleen from a manufacturer, we found, by experiment, that it possessed great power as an emulsifying agent, a small quantity rapidly emulsifying a considerable bulk of lanolin. The extract also peptonized egg-albumen, and converted starch into glucose.

An effort was made to prepare a similar extract with only partial success; abundant evidence, however, of proteolytic action was obtained. A fresh beef spleen was procured and chopped into fine pieces, subjected to the solvent action of very dilute alcohol, and digested for several days at the ordinary temperature of the laboratory. The liquid, after coagulating the blood contained therein, was poured off, filtered and evaporated. The resulting extract was then experimented with.

A small amount of starch, previously boiled with water, was digested on a water-bath at a temperature of 40°C. for several hours, with a small proportion of the solution, and was completely converted into glucose.

A small quantity of freshly coagulated egg-albumen was partially peptonized by digesting for several hours with a small quantity of the solution on a water-bath maintained at a temperature of 40°C.

The spleen was then treated by the Scheffer process used in making pepsin, but no proteolytic action was evident from the solution thus prepared.

These few experiments prove to our minds that the spleen does possess a digestive function, and that an extract possessing proteolytic power can be made therefrom. But no amount of peptic action appears developed by the Scheffer process of extraction.

THE "COFFEE BEAN," AND A PROXIMATE ANALYSIS OF THE PULP FOUND IN THE POD.

BY ROBERT COMBS AND L. F. SAYRE.

Growing in rich woods, and often cultivated for shade, from Western New York and Pennsylvania to as far west as 100° lat, and south to Arkansas and Northern Texas, is found the "Kentucky Coffee Tree" (Gymnocladus canadensis, Lamarck; Nat. Ord. Leguminosae.)

Its generic name Gymnocladus is composed of two very appropriate Greek words, *gumnos*, naked, and *kladus*, a branch, referring to the stout heavy branches entirely destitute of small spray (twigs); and in winter when devoid of foliage, it thoroughly merits the name "naked branch."

The tree is large and tall, with rough bark, *not thorny*, and leaves 2–3 inches long, unequally twice pinnate, several large partial leafstalks bearing 7–13 ovate, stalked leaflets, stipules wanting; flowers dicœcious or polygamous, whitish, in terminal racemes, non-papilionaceous and regular. Calyx 5-cleft, elongated-tubular below. Petals 5, oblong, equal, inserted on the summit of the calyx tube. Stamens 10, short, distinct, and inserted with the petals. Pod oblong, flattened, and sometimes reniform; hard, 5–10″ long and 2″ broad; pulpy inside; seeds flattened, orbicular, often angular from pressure in the pod, ½ in. across, ¼ in. thick, imbedded in the pulp.

The beans (seeds) comprise about 30 per cent. of the whole legume, and are of a blackish-brown horny and glossy appearance, testa being very tough, thick and hornlike, and re-enforced on the inside, on each *flat side* next to the kernel, by a *disk* of white tough material resembling Tragacanth both in appearance and the fact that it *swells* but does *not dissolve* in water. The kernel is bright yellow in color, oily and starchy, and comprises about 57 per cent. of the bean.

A preliminary analysis of the kernel was made, which gave oil as the only consituent of interest. Of this oil, the yield is about 20 per cent. light yellow in color, bland taste, and very little or no odor; when cooled to a low temperature (10° C.), a few crystals of fat formed. When six drops of oil were treated with three drops of strong nitric acid, a light brown color was produced; and six drops of oil to six drops of strong sulphuric acid produced first a purplish color, changing to a violet, which when heated assumed a beautiful red. The oil was not easily saponified with sodium hydroxide.

In the ends of the pods, and around and between the seeds, is found the "pulp," a greenish, waxy, amorphous, more or less hygroscopic substance, with a peculiar disagreeable odor and a characteristic sweetish-acrid, saponaceous taste, and usually constituting about 30 per cent. of the legume. When dried at 100°C. until thoroughly dry and hard, it was found to lose 20 per cent., the dried product appearing in irregular pieces, hard, brittle, greenish-yellow in color, and powdering into a very fine yellow powder almost entirely soluble in water, producing a thin mucilage. The powder, when inhaled, produces violent sneezing.

Domestically the pulp is quite commonly considered as poisonous; in fact it is often used as a "fly-poison," and is claimed to give good results.

To demonstrate its insecticide properties, a large number of flies (musca domestica) were captured by means of an ordinary wire screen fly-trap and transferred to a wire-screen cage, containing two vessels of the powdered pulp mixed with pure sugar and water to the consistency of a thin syrup, and a supply of pure water in a separate vessel, and the cage with its contents placed in a cool place (it having been in August) at twelve o'clock m.

At four o'clock p. m., about three-fourths of the flies were found to be dead, and in six hours from the time of placing them in the cage only a few were still alive.

It is of this "powdered pulp" that the analysis has been made, and although it is not near so complete as might be desired, it is hoped that it may serve to open the field for more extended and thorough researches. After some preliminary testing the scheme of Parsons (Prescott's Organic Analysis, 1887, 408; Pharmaceutical Journal and Transactions (3), 10,-793) was adopted as a guide, and in detail was somewhat modified, as will be hereafter noted.

I. One gram of the powder was heated in an oven at 110°C. until it attained a constant weight, which was .9577 Gm., or a loss of .0423 Gm., (4.23 per cent.) moisture and other volatile material.

II. One gram was placed in a tared crucible and ignited very slowly at first and when completely charred raised to a dull red heat, and continued until the ash was white, and then when cooled in desiccator weighed .0509 Gm. (5.09 per cent). It was mostly soluble in water, giving an alkaline reaction. The remaining quantity was soluble in hydrochloric acid.

III. Twenty grams were treated with chloroform in a continuous extraction apparatus for five hours; then the solvent was driven off, the residue dried thoroughly and found to weigh .8795 Gm. (4.39 per cent.)

a. The residue was treated with water and evaporated to dryness, and then heated in an oven at 110° C. unto constant weight, which showed no loss; *no volatile oil.*

b. The extract was then treated with a small quantity of petroleum spirit, and the filtrate evaporated on a water bath to dryness, then dried in an oven and weighed as fixed oil. The weight was found to be .2926 Gm., (1.46 per cent). The oil was heavy, dark green in color, had a peculiar odor, and a disagreeable, nauseous, slightly acrid taste, leaving a kind of astringent tingling sensation on the tongue. When "frozen" was found to contain some fat. With sulphuric acid (1.84 sp. gr.) in proportion of four drops of oil to one drop of acid, a reddish brown color was produced. No action with nitric acid. Saponifiable with sodium hydrate.

c. The chloroformic residue after treatment with petroleum spirit was dissolved in 80 per cent. alcohol, filtered and the filtrate evaporated to a small bulk; and when allowed to cool some fine white stellate crystals formed. The solution was tested for resin by adding to acidulated water, but only a trace was found. Nothing was done with the crystals for want of a sufficient quantity and time to obtain more.

d. The remaining solution consisted of coloring matter, crystalline principle (?), etc., and was found to contain .5880 Gm. or 2.94 per cent.

The powdered residue which had been treated with chloroform was successively treated by various solvents according to the scheme above

indicated. Further details as to this part of the analysis may be unnecessary, but a summary of the whole is herewith appended.

SUMMARY.

Moisture in the crude pulp	19.39
Moisture in the powdered pulp (I.)	4.23
Ash (II.)	5.09
Fixed oil (III. b.)	1.46
Resin (?), (IV. a.)	.03
Coloring matter and crystalline principle (III. d.)	2.94
Organic acids and allied products (IV. b.)	.33
Glucose (and other sugars?), (IV. c)	16.64
Undetermined extractive (IV. d.)	26.84
Gums (V. a.)	10.06
Albuminoids and colloid extract (V. b.)	13.24
Inert coloring matter (VI. a.)	.85
Starch and allied substances (VI. b.)	3.54
Alkaline extract (NaOH), (VII.)	17.34
Cellulose (VIII.)	2.10

THE EXTRACTS OF COD LIVER OIL.

BY F. E. STEWART, M. D., PH. G.

Since 1822, chemists have frequently examined cod liver oil to ascertain, if possible, the reason why it possesses a stimulating effect upon the processes of assimilation and nutrition, which distinguishes it from all other oils and fats. As a result of their investigations we have about fifty different substances which have been found in the oil, in addition to the fatty matter. Some of these substances are well-known alteratives, and to them the action of the oil as an alterative is said to be due. The majority of these substances, however, occur in such minute quantities that the part they may play in accounting for the action of the oil has been doubted by many. Accordingly, there has been much dispute between opponents in regard to cod liver oil therapy, the opposition maintaining that the value of the oil is entirely due to the fatty matter, which serves as a food, and that the five per cent. of extractives, containing the fifty substances referred to, are impurities which should be eliminated from the oil. According to the analyses of eminent chemists who have hitherto examined the oil, the fatty matter consists of olein and margarin. The latter is now known to be a mixture of palmitin and stearin. Heyerdahl denies the presence of olein and stearin, however, claiming that the oil is principally composed of two new glycerides, therapin and jecolein, which form forty per cent. of the oil, and that the remaining portion consists of other glycerides belonging to the same series as jecolein, but hitherto unknown to chemists. If Heyerdahl's claims prove to be true, then the chemists who have hitherto examined the oil, eminent though they be, are in error. Accepting for argument's sake that his position is a correct one so far as the chemistry of the oil is concerned, I do not see that he explains thereby

the peculiar stimulating action of the oil on the processes of assimilation and nutrition. It is not the province of fat to build tissue, but to supply energy to the system. Later physiologists teach us that the fat of the body is not the stored fat of the food, but is made in the body from the proteids and carbohydrates, the fat of the food taking but a small part in this process. In fact, cod liver oil as a food retards tissue building rather than stimulates it, and is used by Oertel and also by Ebstein in the treatment of corpulency. Dujardin-Beaumetz has pointed out the fact that Hippocrates called attention to the fact that fat has a tendency to prevent the fattening of the body, thereby anticipating modern investigators by more than two thousand years. Admitting that, as a rule, cod liver oil is assimilated more readily than other oils, this does not render it capable of playing a part in nutrition diametrically opposed to all other oils and fats. By supplying the system with fuel it undoubtedly may aid indirectly in the production of tissue by increasing the general strength of the patient; but, as Mays has pointed out, strychnine has much more efficacy in the stimulation of tissue metabolism than cod liver oil. No less an authority than the United States Dispensatory declares the nutritive theory untenable when it says: "As to its mode of action, there has been much difference of opinion. Some consider it merely a nutritive agent, having the advantage over other oleaginous substances of a readier entrance into the system and more easy assimilation. But we cannot agree with this opinion. Other oleaginous substances, certainly not less nutritious, have not been equally efficient, though taken in much larger quantities. If this be the true explanation, persons living chiefly on milk, which abounds in oil, or on fat pork, ought to show a special exemption from scrofulous complaints. The probability appears to us to be that, in consequence of some peculiar principle or principles it contains, it exercises a stimulant and alterative influence on the processes of assimilation and nutrition, thereby aiding in the production of healthy tissue."

All authorities admit that cod liver oil contains from two to five per cent. of extractive matter. The composition of this exractive matter, however, is, to a certain extent, a question of dispute. Gautier & Mourgues discovered several new principles in the extractive matter, to some of which they gave the name leucomaines. Some authorities claim that the so-called leucomaines are really ptomaines resulting from the decomposition of the liver. Their reason, however, is probably based on theory rather than investigation. It has been taught by the text-books that the color of the various brands of cod liver oil on the market is due to the presence of the products of putrefying livers occurring during its preparation. During the past year I have had an opportunity of careful investigation of this subject, and I find that the color of the oil is not due to the presence of putrefactive substances even when the oil is made of putrid livers; for I have had made under my direction during seventy-two hours, samples of oil of every

shade on the market, from the palest straw color to the darkest brown, without the occurrence of putrefaction. Contrary to the teachings of the text-books, cod livers do not putrefy readily, on account of the presence of bile acids which are powerfully antiseptic. During the process of preparing the specimens of oil referred to, the liver was submitted to frequent microscopical examinations for bacteria, and after the operation cultures were made from the oil and also from the chum, a name given to the broken-down liver parenchyma left after the operation of preparing the oil, and the absence of bacteria was thoroughly demonstrated. Without bacteria there can be no putrefaction, therefore the organic bases referred to, which on examination were found in the oil, are not ptomaines. Suppose, however, for argument's sake, that these substances were ptomaines. What does it signify? Propylamine is a ptomaine, and yet Bartholow and other authorities looked upon its presence as a possible explanation of the peculiar alterative value of cod liver oil. In fact they used the propylamine separate in the treatment of rheumatism, with more or less gratifying results. Leucomaines and ptomaines resemble each other closely, only one is a product made in the body during life, and the other is not formed until after death, when putrefactive decomposition is under way. For examples of leucomaines, I refer you to the poison of snakes, bees, and other reptiles and insects. Snake poison, although so poisonous, when given in small doses is found to have a stimulating effect upon tissue metabolism; quite similar in many respects to strychnine, which is a highly toxic vegetable alkaloid. It was not until the introduction of the extracts of cod liver oil which have found a large demand under the names of morrhuol, jecorol, etc., that objections have been urged strenuously against the employment of the extracts or preparations of them in medicine. The objections in nearly every case can be traced to manufacturers and dealers in cod liver oil and its preparations, whose trade has been injured by the advent of the extracts.

The literature on cod liver oil not being familiar to most pharmacists, it may be well to review briefly the work which has been done since 1822 on cod liver oil extracts. The following review is condensed from a recent work on Cod Liver Oil and its Chemistry:

The first chemical examination of cod liver oil was made by Wurzer* in 1822. By shaking the light brown oil with water he obtained on evaporation an extract of a yellowish color, viscid, acid reaction, herring-like odor, bitter taste, deliquescent, soluble in water and alcohol. Spaarman† (1828) likewise obtained an aqueous extract of a fishy smell, and an acid reaction, soluble in alcohol. Marder‡ (1830) also obtained an extract

* Hufel. Jour., Dec., 1822, p. 31.

† Geig. Mag., June, 1828, p. 302.

‡ Brandes Archiv., xxxii, 90.

from cod liver oil, which contained green soft resin, brown hard resin, and gelatin, also 5 per cent. of brown coloring matter. Hopfer de l'Orme* (1836) found iodine in the light brown oil. Wackenroder† (1838) saponified the oil with caustic potash, ignited the soap, and from the ash extracted potassium iodide, from which, after purifying, he separated the iodine. One specimen of brown oil yielded 0.324 per cent. of iodine and another 0.162 per cent. by this process. Herberger‡ (1839) determined the bromine present in cod liver oil as potassium bromide. Stein‖ (1840) showed that the percentage of iron can only be determined by saponification of the oil with caustic potash or soda and ignition of the soap.

DeJongh§ (1843) made extensive investigations of cod liver oil. He found in it a reddish brown substance, by evaporating the aqueous extract, soluble in alcohol, less so in ether, and nearly insoluble in water. From an alkaline solution acids precipitated it in the form of a reddish brown flaky deposit. The extracts which he obtained from pale, light brown and brown cod liver oil, had a peculiar smell and a bitter taste.

From the pale oil, he obtained, by agitating with cold water, 0.607 per cent. extractive. Boiling with hot water took from the oil 0.513 per cent. The light brown oil yielded to cold water 0.890 per cent., hot water, 0.849 per cent., while from the brown oil he obtained 1.288 per cent. with cold water, 1.256 per cent. with hot water.

By treating the extracts with ether, De Jongh obtained a substance which smelt and tasted like bile, and, after a time, formed crystals. He also obtained ammonium fellivate and cholate, bilifulvin, biliverdin, and bilifellic acid, and a black, glistening substance soluble in alkalies, concentrated sulphuric acid, and hot acetic acid, but insoluble in nitric and hydrochloric acids. Also an *organic substance*, nature undetermined, and inorganic salts, among which were hydrochloric, phosphoric and sulphuric acids, lime, magnesia and soda.

De Jongh obtained from the lead soap made by him from cod liver oil a peculiar brown substance to which he gave the name *gaduin*. He looked upon it as the hydrated oxide of an unknown hydrocarbon C_5H_6, its rational formula being $7(C_5H_6O)2(H_2O)$. He also demonstrated the presence of bromine, iodine, phosphorus, sulphur, and other substances named in the tabulated statements of his analyses.

Personne¶ (1851) confirmed the observation of De Jongh that more iodine can be found in the light brown than in the pale oil. Riegel**

* Hufel. Jour., Apr., 1836, p. 115.

† Arch. de Pharm., xxiv, p. 15.

‡ Ann. d. Ch., xxxi. 94; Jahrb. f. pr. Ph., 1839, p. 178; Centralbl., 1839, p. 853.

‖ Journ. f. pr. Ch., xxi, 308.

§ Disquisitio Comparativa Chemico-medica de Tribus Olei Jecoris Aselli Speciebus.

¶ Mémoire presentée à l'Académie Nationale de Médicine, 1851.

** Arch. d. Pharm., cxx., 48; Jahresb. d. Chemie, 1852, p. 707.

(1852) tested the oil for sulphur, phosphorus, iodine, bromine, chlorine, sulphuric and phosphoric acids. His analyses will be found appended. Winckler ‡ (1853) came to the conclusion by his investigations that oleic and margaric acids and *propyl oxide* were formed, but not glycerin. He obtained ammonia and a trace of trimethylamine by distilling the soap with a solution of caustic potash. Luck § (1856) found that by first warming, then chilling the oil, small crystalline flakes of fatty acid were deposited, to which he gave the name of *gadinic acid*, and supposed to be the solid fatty acid in cod liver oil. Berzelius ‖ (1856) noted the resemblance between the reactions of gaduin and bilifulvic acid, and was inclined to believe that the former was originally this acid. He thought that the reddish-brown substance which he prepared from bilifulvic acid was a modification of gaduin. Nadler* (1862) found that the light brown oil of De Jongh, the same variety now made by Isdahl, contained the most iodine; the very pale oil contained less, and another light brown oil least of all. Oswald Naumann † (1865) is the first investigator who experimented with the oil in regard to its comparative diffusibility through animal membranes. He found that the oil dialyzed quicker, rose higher in capillary tubes, was more easily oxidized than neat's-foot oil, and showed by experiments on living cats that it was 1.8 times more readily absorbed. Carl Schaper ‡ (1869) made analyses of the oil and found, in addition to the presence of palmitic and oleic acids, *lipyloxide* ($C_6H_{10}O_3$), trimethylamine, ammonia, biliary matters and iodine. Maumene § (1880) experimented with the oil, but discovered nothing new in relation to its contained extractive matters.

P. Carles‖ (1882) made some very interesting observations which demonstrated that freshly prepared, neutral, filtered oil, contains no phosphorus, but the darker and more acid oils contained phosphates in solution derived from the disintegrated liver parenchyma. He also was able to show that *no* iodine is found in the pale oil, while it is present in the acid brown oil in proportion to its color and acidity. "The author concludes that the cause of its presence is the same as that of phosphorus. In the fermentation process formerly in use, the livers were exposed to the air, and the higher temperature thereby created caused the oil to absorb oxygen in the form of ozone, which is capable of isolating iodine from the

* Arch. d. Ph., cxxvi., 185.

† Jahresb. d. Chemie, 1856, p. 490.

‡ Pereira: Elements of Materia Medica, ii., 779.

§ Jahresb. d. Chemie, 1862, p. 64.

‖ Arch. d. Heilkunde, 1865.

¶ Wiggers, Hufem. Jahresb. d. Ph., 1869, p. 340.

** Compt. rend., xcii., 721.

†† Ph. Centralh., xxiii., 279; Journ. de Ph. et Ch., v, 145.

alkaline earths contained in the liver parenchyma. It is this iodine which in the nascent state combines with the fatty compounds." Schädler* (1883) called attention to the superior solubility of cod liver oil in boiling alcohol as a means of distinguishing it from other oils. Stanford† in the same year analyzed the oil for iodine and pointed out that the estimates which had been made were too high. Kremel‡ (1884) made tests to distinguish oils from various sources from each other. Some of his tests incidentally verified the work of others in regard to the presence of biliary matter, etc. Rössler§ in the same year experimented with the reaction between cod liver oil and *aqua regia*, but added nothing of value to what was already known concerning the extracts. Jean‖ (1885) "found that six per cent of the oil consisted of a light yellow oily unsaponifiable substance, which is colored brilliantly red by a drop of sulphuric acid." Allen and Thompson* in the same year pointed out the presence of cholesterin in the oil. Hager† made researches to determine adulterations in cod liver oil, which are of interest in this connection only because of their confirmatory nature. Salkowsky‡ (1887) devised various tests to distinguish between liver oils and vegetable oils. While of importance, his work is not of special interest in this connection. Buchheim apparently demonstrated that cod liver oil does not contain any biliary acids or bile pigments, and the well known sulphuric acid reaction has some resemblance to that of cholesterin in chloroform solution. Van der Burg§ (1888) found a trace of ash on incinerating the pale oil, but in twenty-two Gms. of De Jongh's light brown oil he found 0.002 Gm. of ash containing calcium and iron. Hirsch‖ (1889) gave the solubility of the variously colored oils in alcohol, ether, chloroform, and carbon disulphide

This brief summary will give some idea of the cod liver oil field, as far as the extracts are concerned, at the time when Gautier and Mourgues took up the work in the year 1889. During this time general chemical knowledge, both inorganic and organic, especially the latter, had greatly accumulated, and processes of investigation improved proportionately. Gautier, especially, had added much to the knowledge of organic bases. He had discovered the distinction between that class of organic bases due

* Technolog. d. Fette, 2d ed., i, 773.

† Br. Pharm. Conference, 1883; Ph. Journ. and Trans. No. 679, p. 353.

‡ Ph. Centralh., xxv, 337.

§ Drogisten Zeitung, 1884, No. 10.

‖ Monit. Scientif., 1885, p. 892.

¶ Benedikt's Analyse d. Fette, 2d edition, 369.

** Ph. Centralh., xxvi, 13.

†† Zeitsch. f. anal, Chemie, xxvi, 1887.

‡‡ Encyclop. d. gesammt Ph., 1889.

§§ Encyclop. d. gesammt Ph., 1889.

to retrograde metamorphosis in living bodies, to which he gave the name of leucomaines, to distinguish them from allied bodies formed during the decomposition of non-vitalized bodies and known as ptomaines. He was therefore specially qualified to take up the work of cod liver oil analysis. He examined the various cod liver oils and demonstrated the presence of several leucomaines, to which he believes the alterative action of the oil is in part due. In his little brochure, "Les Alcaloides de l'Huile de Foie de Morue," his processes are fully given, of which the following is a translation in part:

One hundred kilos. of Madeira-colored (light brown) oil was shaken with its own volume of alcohol (35 per cent.), containing 3 grammes of oxalic acid per liter. In order to prevent oxidation, the air in the bottles employed in the process was replaced by carbonic acid. After standing for some time, the alcoholic extract was drawn off and almost neutralized with milk of lime, after which it was filtered and distilled *in vacuo* at a temperature of 40° C. When the liquid had been reduced to one-twentieth of its original volume, the distillation was discontinued; the clear and slightly colored liquid was saturated with calcium carbonate, filtered, and distilled *in vacuo* to dryness. The residue was treated with 80 per cent. alcohol, the extract filtered, the alcohol evaporated, and the liquid concentrated *in vacuo* to a syrupy fluid, from which the bases were separated by the addition of dry potassium hydrate, and extracted by shaking with ether, from which they were precipitated by an ethereal solution of oxalic acid. The precipitate was washed with ether and dried. From 100 kilos. of oil 52 grams of oxalates were obtained almost colorless and perfectly soluble in water. The bases were then isolated by dissolving the oxalates in a little water and adding potassium hydrate, when they appeared as a thickish brown floating layer, which was removed and dried over freshly fused potassium hydrate. Fifty-two grams of oxalates gave 26.5 grams of free bases. Subjected to fractional distillation, first under atmospheric pressure, afterwards under diminished pressure on an oil-bath, they separated into several volatile and non-volatile bases.

The first fraction, which boiled at 87°–90° C. under a pressure of 770 mm., was *butylamine*, and constituted one-sixth of the whole. The ultimate analysis corresponded to the formula $C_4H_{11}N$.

The boiling point of the second fraction was between 94° and 100° C. under the same pressure (770 mm.) It consisted of *amylamine*, $C_5H_{13}N$, and constituted one-third of the whole.

The third fraction boiled under the same pressure between 100° and 115° C., and proved to be *hexylamine*, $C_6H_{15}N$. It formed but an inconsiderable part of the constituents.

The fourth fraction boiled at 100° C., under a pressure of 60 mm., and at 198°–200° C. under 770 mm., pressure. It was *dihydrolutidine*, $C_7H_{11}N$, and constituted one-tenth part of the bases.

The residue from the distillation constituted the non-volatile bases. Treated with dilute hydrochloric acid and precipitated with platinous chloride, the precipitate was decomposed with sulphuretted hydrogen and again precipitated with caustic potash. Dried on unglazed tiles it was found to be *aselline*, $C_{25}H_{39}N$, and constituted barely one-fifteenth part of the bases.

The mother-lye from the platinum salt of aselline was evaporated, depositing a platinum salt from which, by decomposition at a higher temperature with sulphuretted hydrogen, there was obtained a chloride of *morrhuine*. The base morrhuine, $C_{19}H_{27}N_3$, was isolated with caustic potash, and by extraction with ether. It formed one-third part of all the bases.

After the bases had been extracted from the alkaline syrupy fluid by shaking with ether in the manner above described, the residue was examined in search of the acids with which the bases had probably been combined in the form of salts.

After adding a little sulphuric acid, the following acids were obtained :

1. An acid which, especially on the application of heat, appeared as a brown sticky mass, capable, however, of crystallization. It was a pyridine compound, and received the name of morrhuic acid, $C_9H_{13}NO_3$. One litre of the oil contained one gram of this body,

2. After the separation of morrhuic acid the liquid was distilled, and in the distillate were found formic and butyric acids.

3. In the residue there remained :

a. A small quantity of morrhuic acid, which was removed by alcoholic ether.

b. A certain quantity of phosphoric acid originating from phosphates, phosphorglycerins and lecithins.

c. A little sulphuric acid of the same origin.

4. After the separation of these substances the remainder was precipitated with basic lead acetate, filtered, the lead removed with sulphuretted hydrogen, evaporated, and extracted with 98 per cent. alcohol. After the evaporation of the latter the liquid was distilled *in vacuo*. In the part of the distillate which boiled at 180° C. glycerin could be identified by its being converted into acroleïn.

Gautier & Mourgues have never claimed that the fatty matter of cod liver oil is valueless. On the contrary, they give it due credit in conjunction with the other substances found in the oil. Quoting from their monograph entitled, "Les Alcaloides de L'Huile De Foie De Morue" their verdict in relation to cod liver oil is :

"First, cod liver oil acts by the fatty bodies which are easily assimilated because of the slight acidity and partial saponification which can be attributed to the hepatic ferments ; also because of the presence of biliary principles in solution, which render emulsification extremely easy, espec-

ially in the digestive tract, where it aids the action of the pancreatic trypsin. These easily digestible fats (namely the fatty bodies already referred to) are ready for immediate assimilation, their ingestion resulting in storing the body with protective agents or reserve material to be utilized as needed by the economy to supply fuel for producing heat, etc."

Second. "These oils act as energetic builders of tissue by their richness in phosphates, phosphoglyceric acid, lecithin and phosphorus in other organic states. It is known that under the last three forms the economy assimilates phosphorus most easily. This element is indispensable to the production of the nuclein of the cell and therefore to the proliferation of the cells. It is also known that these same forms of phosphorus preside more particularly over the activity of the highest cells in the scale of life; cells of brain, eggs and embryo."

Third. "The basic principles, already referred to, stimulate the nervous system, augment the appetite, accelerate intra-organic oxidation, and increase the secretion of urine and sweat. Morrhuin is the most important of the matters found in the extract. It is a powerful stimulant of the functions of nutrition and assimilation promoting metabolic changes. It produces a rapid circulation of the extractive residues of cell life towards the excretory organs, where they are eliminated, provoking in their way, indirectly, a powerful movement of assimilation (anabolism), correlative of the losses consequent upon the inverse movements of de-assimilation (katabolism). This is considered as proven by the super-excitation of the appetite of animals brought under its influence."

Our own investigations already referred to prove that the color of cod liver oil is probably due to a process of oxidation in the livers, by which they are darkened on exposure to light in the same manner that a freshly-cut apple is affected by similar agencies. Freshly-cut meat darkens in the same way when exposed to the light. When the liver is taken from the living fish it is a very light gray, in fact almost white. When exposed to the light it soon changes to a dark brown. This change may be retarded by immersing the fresh liver in alcohol and keeping it there; but the liver taken from the living fish and placed at once in alcohol, although the alcohol prevents the putrefaction of the liver, does not prevent the darkening of the liver by exposure to the light.

The different shades of color of cod liver oil, and the presence of extractive matters therein, are due to (1) the length of time the oil is exposed to the light during its preparation, and (2) the amount of heat used in the preparation; for some of the substances, being volatile, are driven off if too high heat is employed. On this account the pale oil contains but little extractive matter and is deficient in Gautier & Mourgues' leucomaines. The light brown oil contains more extractives, and is richer in the leucomaines referred to. The dark brown oil, while containing more extractives is deficient in the leucomaines as they are partially driven off during the operation by the heat employed.

Bouillot points out the fact that the true source of the extractive matters of cod liver oil is the livers themselves. Upon investigation we find this to be true. If the process of Gautier & Mourgues is applied to the fresh liver a large yield of extractives is obtained containing these leucomaines. It is not surprising that the manufacturers of cod liver oil, however, are alarmed by this discovery; for if the extractives are employed separate from the oil, and can be obtained in large quantities from the fresh livers, and it is found that the administration of the extractives in conjunction with a properly-selected diet, in which proteids and carbohydrates take their proper places, is preferable to dosing the patients with the nauseating fat of cod liver oil, then the sale of cod liver oil itself is liable to be seriously interfered with. In fact it is already being interfered with in a serious manner, and the reason for the bitter hostility of the cod liver oil manufacturers is thus readily explained.

The physiological action and therapeutic properties of the extract made by the process of Gautier & Mourgues have been demonstrated by them and also by Bouillot, who finds that they are powerful stimulants of tissue metabolism. We have already quoted from Gautier & Mourgues' paper, and now quote from Buillot:

"The remarkable studies of MM. Gautier and Mourgues on the alkaloids of Cod Liver Oil, show us definitely the nature of the principles to which are due, to a very great extent, its medicinal properties.

"The physiological experiments made by these authorities on animals prove that the alkaloids referred to act:

"1. As stimulants of nutrition and of the circulation.

"2. As diuretics.

"In presence of such remarkable results explaining the therapeutic action of the oil, I have thought it possible to utilize in medicine the alkaloids themselves; besides, it appeared to me interesting to inquire if the effects observed by MM. Gautier and Mourgues, in their experimentation on animals, and especially its action as a stimulant to the appetite and diuresis, were noticeable when exhibited in a human being.

"Guided by this idea, I prepared some of these same alkaloids, but in the present case have not attempted to isolate them, and I have administered therefore the whole of the active principles of Cod Liver Oil as a medicinal unit.

"The dose administered by the mouth to normal subjects in 24 hours varied from 15 to 25 centigrammes.

"The analysis of the urine made before and after the administration of these alkaloids showed that:

"1. The volume of urine voided during the 24 hours, as well as the amount of urea, was considerably increased.

"2. That it acted as a powerful stimulant to the intra-organic oxidation, a fact already formulated in the conclusions of the original work.

"From a clinical point of view, the following are some of the results obtained on treating a number of patients with the active principles of cod liver oil:

"1. Five young women with vague pains, loss of appetite, progressive decrease of strength, neurasthenia: The effects in the first place were increase of appetite, return of strength, with loss of the painful symptoms referred to. Three of them who had not menstruated for a considerable period were relieved of the suppression a short time after beginning the treatment.

"2. In the case of two children who were suffering from malnutrition, the appetite promptly returned in a few days.

"3. Three patients who were afflicted with severe eczematous eruptions at each menstrual period, were cured of this trouble.

"4. In two cases of bronchial catarrh in old patients, the alkaloids produced the well-known effect of cod liver oil, and were administered with advantage and perfectly tolerated.

"These observations show that the active principles of cod liver oil are of undoubted value as therapeutic aids where the oil is indicated."

It is not at all surprising that the leucomaines discovered by Gautier & Mourgues in cod liver oil are stimulants to tissue metabolism. There are several analogies of value in this connection. The stimulating effect on nutrition from small doses of snake poison has already been referred to. It is well known that the leucomaines creatin, creatinin, carnin, etc., in lean meat, are stimulants to the process of tissue building. It is also found that various extracts of animal tissues, which have been introduced under the general term "animal extracts," possess peculiar effects upon nutrition. The extract of the thyroid gland and of the suprarenal capsules are instances of this. It is apparent, therefore, that the body contains substances (leucomaines) which, when given in proper doses, are powerful stimulants to tissue building. Further investigation should be conducted along this exceedingly promising line. A great deal has been said in lauding the animal extracts which is not borne out by the facts; but that certain animal extracts are designed to take a prominent place in therapeutics, there is little reason to doubt.

There can be no objection whatever to using the various organic bases from cod liver oil referred to as therapeutic agents, provided their true nature is made known to the profession. They are much more acceptable to the stomach than cod liver oil, and when administered in conjunction with a generous diet are probably capable of doing as good, if not better work, than cod liver oil itself. Their physiological function is to fan the process of tissue metabolism. Unless proper food is employed with them, they are valueless. It has been shown that on account of the powerful stimulating nature of creatin and creatinin on tissue metabolism, animals fed exclusively on beef extract die sooner than those deprived en-

tirely of food. As well might one put the blower on an exhausted fire without adding coal, as to administer such agents to debilitated patients without supplying them with proper food. According to Foster's physiology, the extractive matter found in lean meat is an essential element of the diet; and although the system will appropriate meat deprived of its extractives, when the digestive apparatus is in health, yet their presence renders the food sapid and materially aids its digestion. The appetites of invalids are stimulated by the extracts, and they digest their food more readily in many instances when extracts are added to the dietary.

COD LIVER OIL.

Its principal American sources, with a few observations regarding the various kinds upon the market, and a comparison of the yield of the so-called alkaloids in the different colored oils and in the fresh livers.

BY C. C. SHERRARD.

The fisheries of America are second to none in the world, and prominent among these is the cod fishing industry. The by-products in the codfish industry have become almost primary sources of profit. Chief among these products are cod liver oil, glue, isinglass and fertilizers, the first named creating by far the greatest interest because of its commercial value, as well as its medicinal properties, which elicit a great deal of interest from the scientific world.

The North Atlantic ocean is a store-house of piscatorial wealth, and the American side has been in the vanguard for several generations; hence it may be in place to give a brief resumé of the history, habits, etc., of the cod. They are somewhat of a migratory disposition, and are not found in equal abundance at the same place or fishing ground the whole year round. Off the American coast they may be obtained in greater or less numbers at all seasons of the year from Cape Hatteras, the southern limit of the cod, to Hebron and Lampson on the North, but they are more abundant at certain seasons in different latitudes. The period of arrival at certain grounds varies slightly at times, although usually quite regular. The arrivals and departures vary about the same as do the migratory movements of birds, or the flowering of plants. The codfish have, therefore, practically certain stated seasons for different latitudes, and times for their appearance and departure.

The following table by Prof. Hinds is more accurate than I could construct from hearsay or my own observations:

Latitude.	Locality.	Mean Date of Arrival.	Mean Date of Close of Fisheries.	Mean Length of Fishing Season.
46° 1′	Newfoundland,			
47° 30′	Conception Bay,	June 1st,	November 20th,	
48° 20′	Bonavista Bay,	June 10th,	November 10th,	
48° 30′	Notre Dame Bay.	June 20th,	November 10th,	
50° 00′	Cape St. John to Bar Point,	June 20th,	November 1st,	143 days.
49° 30′	White Bay,	June 10th.	November 1st,	
51° 00′	Cape Rouge Harbor,	June 10th,	November 1st,	
51° 36′	Cape Bauld to Cape Onion,	June 20th,	October 20th,	
	(Over 4 degrees of latitude.)			
	Southern Labrador.			
52° 00′	Chateau Bay,	June 20th,	October 1st,	
53° 24′	Baiteaux,	July 12th.	October 10th,	
54° 26′	Indian Harbor,	July 15th,	October 1st,	87 days.
54° 56′	Cape Harrison,	July 18th,	October 1st,	
	(Over 3 degrees of latitude.)			
	Northern Labrador.			
55° 14′	Aillik.	July 20th,	October 1st,	
54° 57′	Kypokok,	July 20th,	October 1st,	
55° 27′	Hopedale,	July 20th,	October 1st,	
53° 30′	Double Island Harbor.	July 22d,	October 5th,	
55° 52′	Ukasiksalik,	July 28th,	October 1st,	61 days.
56° 33′	Nain,	July 28th,	October 1st,	
57° 30′	Okak$_2$	July 28th,	October 1st,	
58° 30′	Hebron,	August 15th,	September 25th,	
58° 46′	Lampson,	August 15th,	September 15th,	

From Conception Bay northward for about seven hundred miles, the cod approach the shore about one degree later for each degree of latitude.

From 47° to 50° 30′, a distance of ahout seven hundred statute miles, the cod fishery goes on simultaneously during August and September. Likewise the cod approach the coast of Maine late in the spring, and retire to deep water in the autumn; farther to the southward they approach the coast late in the summer or early fall, remaining until well into the winter; and in still lower latitudes, south of Cape Cod, at Vineyard Sound, Buzzard's Bay, and off the shores of Connecticut, New York, Delaware and New Jersey, and even off the Virginia coast, they approach the shore only in the Winter, thus affording excellent fishing during the Winter season.

The theory of the old fishermen for this peculiar conduct of the fish is a rational one. They say that their periodical movements to and from the shore are governed solely by the change of the temperature of the water, because the cod prefers a temperature of 30 degrees to 45 degrees F. This temperature is sought and found in the deep water, and on the off-shore banks, where they come in contact with the waters of the Arctic currents off Southern New England in the summer season, coming in near

the coast in the winter time; the Arctic currents also furnish immense supplies of food, which they carry down from the Arctic seas. As we advance northward, the approaching and receding of the fish to and from the shores are gradually reversed, until we find the fish near the coast in the summer, and in deeper and warmer water during the colder weather. While this theory has not been definitely proved, yet it appears quite plausible, and is further known to be partially true; and it may yet be shown that fishing in deep water at these alternate seasons will yield as good returns as the present methods.

Prof. Baird states that in European seas the depth at which fishermen look for cod varies with the season of the year, and is a point which much attention is paid in Norway and England. This theory of our fishermen has been commented upon by Prof. Hinds as follows:

"When the coasts of Finmark are thronged with fishermen catching their fares of the 'Lodde,' or summer cod, the shores of northeast Newfoundland, and the shore of the Gulf of St. Lawrence are alive with fishermen, successfully capturing the same variety of fish in British-American waters; and when the Russian on the Murmanian coast is laying in his winter stock of cod, the Newfoundlander and the Labradorian are securing their fares as far north as the Moravian missionary stations, Okak and Nain. So also in the North Sea and on the coast of the British Isles, around Faroe Island, all along the Icelandic shores, on the south coast of Greenland, off Arksut Fiord, away up north to Tarske Banks, and down the Atlantic coast of America to the grand banks, and as far as and even beyond St. George's Shoal, the cod is taken simultaneously and in great abundance.

"Local variations of days, and even weeks, occur in a coast line, or stretch of shallow sea, of not more than 100 miles in length; but these variations arise from one great leading cause, which guides the cod in its approach to known feeding grounds on the coast, or known banks at sea. This leading cause is temperature, which determines the movements toward the coast of the various forms of marine life on which the cod, inhabiting different waters, is accustomed to feed. The cod caught on each stretch of coast line within variable, but tolerably well-defined limits, are *indigenous* to the sea area adjacent to the sea-coast which they frequent. The depth at which cod-fish are found varies greatly, therefore, with the season and locality."

"I once heard a story regarding the migratory disposition of the cod, and supposed it to be a facetious fish yarn until I afterward heard of its being published as a matter of fact in a medical journal. The writer of the article was interested in a Norway cod-liver oil, and thought, I presume, that he had struck upon a clever ruse to demonstrate the superiority of Norway oil over American cod liver oil. He claimed that the cod spawned only off the Norway coast, and after the spawning season they

set out on a three-thousand-mile journey for the American feeding grounds, and by the time the fish had reached the feeding and fishing grounds of our coast, they were very greatly fatigued and exhausted with the long swim, and in consequence they had become very poor and thin, and their livers, therefore, were lean, and contained but a small amount of oil of very inferior quality. Our people always know when the schools approach the shore, and proceed to capture them, not knowing, it would seem from the above, that they are securing lean and exhausted fish, whose energies had been spent in a transatlantic voyage.

"This little narrative is given more particularly to note to what extent men will sometimes warp their conscience in their greed for pecuniary gain, and to the possible detriment of scientific knowledge. Rare or isolated instances are known where cod-fish have left their usual feeding grounds and traveled for long distances. Fish from the coasts of Labrador have been caught off the northern New England coasts, but these are exceptions to the general rule of their habits, and may be accounted for by the fact that the food usually abundant at their old haunts is scarce, and they wander farther southward along the coast.

"A very complete discusssion of the habits, food, movements, etc., of the cod may be found in the reports of the United States Fish Commission.

"In my own personal observations, I found so much of interest bearing upon this part of the subject that it is with considerable reluctance that I pass it by, thinking perhaps it is less interesting to others than to myself.

"The bait used in capturing the cod consists principally of blue crabs, clams, lobsters and herring. Clams are used only in hand line and dory fishing, not with trawls. Lobsters are extensively used as bait as far south as Cape Cod. Fishermen say that when a cod will not bite soft lobster bait, there is no use to try to catch him by other means. The fresh and frozen herring, however, furnish the principal bait, and are used very extensively all along the coast.

"The cod is one of the most prolific of ocean fishes, one fish producing millions of eggs. The number of eggs varies with the size and age of the fish. To estimate the number of eggs, several female fish are taken just before the period of maturity, the fish weighing from 20 to 70 or 75 lbs. The ovaries are removed and weighed, and small quantities of the eggs are then taken from different parts of each, and weighed on delicately adjusted balances, and these eggs are carefully counted. The number obtained in a given weight being known, it is easy to ascertain approximately the total number for each fish. In one instance, a 21 lb. fish contained 2,700,000 eggs, and a 70 lb. fish contained 9,100,000. The eggs are quite small, the largest from a large fish measuring about $\frac{1}{19}$ to $\frac{1}{17}$ of an inch in diameter when mature and impregnated. Many of these eggs are never fertilized, others are often destroyed by freezing, and numerous other agencies interfere, not only to destroy the eggs, but thou-

sands of the small fish, after they have hatched, so that comparatively only a very small percentage of the many millions of eggs are responsible for a full grown fish.

"The size of the cod along the American coast varies considerably. This is due principally to the age of the fish, for, as previously stated, they are of a migratory disposition; yet considerable numbers of them may be caught all the year around in the same locality, the younger fish being less of a migratory turn than the older ones, and when a shoal appears on certain fishing grounds to spawn and feed, we find among them also many resident younger fish, varying greatly in size. Mr. Farall has devoted considerable study to the size of the cod at different ages. He says that in June the fish hatched the previous winter, or those about six months old, range from one and one-half to three inches in length; those eighteen months old vary from nine to thirteen inches in length, and weigh 7 or 8 ounces; those supposed to be two and one-half years old are 17 or 18 inches long, and weigh two to two and one-fourth pounds; those three and one-half years old, measure about 22 inches, and weigh four to five pounds. The male, he claims, reaches the age of maturity at three years, whereas the female does not arrive at that period until four years old. On the shoal banks of New England, it is quite common to catch cod weighing from 30 to 70 pounds, and a number have been caught weighing from 80 to 160 pounds. Two cod-fish caught in my presence weighed 60 and 70 pounds respectively. A male cod-fish caught on Cape Cod weighed 160 pounds.

"Cod differ in size in different localities. Grand Bank cod require 30 to 40 to make a quintal when dried. Those caught in the Gulf of St. Lawrence by hand lines are smaller, requiring 70 to 80 per quintal. In some localities, however, such as off the coast of Cape Ann, the fish caught on trawls are larger, requiring but 20 to 25 per quintal; while on the coast of Labrador they are much smaller, requiring from 100 to 110 per quintal."

Some seasons they are much larger than at others. This is due to two facts, one being that the younger fish sometimes approach the coasts, and again that large shoals in rare cases come down from the coasts of Labrador, and the farther northern coasts, where they are naturally smaller. Market fish weigh from 6 to 10 or 12 pounds.

Of course, where we find so much variation in the size of the fish, we find a corresponding variation in the size of the livers. Two livers taken from large fish were found to measure, when unfolded, two feet and ten inches and three feet in length, and weighed four and six pounds, respectively. On the average, cod livers yield 40 per cent. of their weight of oil, and four to five per cent. of the weight of the fish is liver; consequently a catch of 80,000 pounds of fish would yield 3,600 pounds of livers, and about 180 gallons of oil.

The province of this paper will not permit me to go into the details of the methods of fishing, beginning with the preparation of the bait, baiting hooks, casting lines, dressing and care of the fish, etc., etc., however, interesting it might be.

From my own observations, after spending about five months right among the fishermen, and at various fishing stations, I can see no reason why we have not just as good and as ample a supply of cod-fish, and cod liver oil from the American fisheries as from abroad, if indeed there be any practical difference at the present time, except in name. It is quite an easy matter in advertising to put forth some special claim such as lean fish, due to swimming across the ocean, or a secret method of preparing the oil, whereby it is made to appear superior to all others, when if the facts were all known, there is probably little or no difference as to quality and appearance. It is true, however, that some of our larger manufacturers are not as circumspect as they should be in the collection of their cod livers for preparing oil for medicinal purposes, but this fact does not preclude the possibility of its being done, neither does it signify that all our manufacturers are prone to the same neglect, for they are not. Could we look in upon the methods employed by our foreign competitors, we might find more or less of the same objectionable features. I have in numerous instances, noted the quality of livers, and their condition when brought ashore, and have in a number of cases, particularly with manufacturers on a small scale, examined their oil, and found it to be unequalled for brilliancy and sweetness and pleasantness of odor and taste. In such instance, also, these manufacturers are as a rule very careful to exclude all other livers than cod, as well as diseased cod livers, thus making their oil strictly pure in name as well as in quality. It is probably well known that at certain seasons of the year in all fishing grounds in Norway, Japan, Alaska, and America, that many other fish abound and are caught on the same lines with the cod. It sometimes happens that the other varieties are far in excess of the cod, and while with some, the oil may be equally efficient as that of the cod, yet until that fact is demonstrated beyond a doubt, these livers should be rejected as is properly done with a few of the smaller manufacturers. This is done very easily and economically by assorting the fish prior to dressing them, but it affords a great temptation to the fishermen, as well as to the manufacturer, for the oil from whatever source it is made, if it can be marketed as cod liver oil, commands a much better price than if sold for tanners or other purposes. This is one of the great faults we hear about our American oil, but I am told from good, and apparently reliable sources, that the same criticism holds good with our foreign oils. In Norway, it is claimed that shark, seal, ling, and other oils are used extensively, particularly in seasons when the cod are scarce, as frequently happens. We have no defense to make of our own manufacturers, whatever the nature of their improprieties may

be. With some of the larger manufacturers, I regret to say little attention is paid to the kind of fish livers, and the condition they are in when accepted for the preparation of medicinal cod liver oil. Eliminating these objectionable features, just as good oil can be manufactured in this country as any place in the world.

To prepare a sweet cod liver oil, the livers should be collected in cold weather, and at once freed from intestines, gall sacs, etc., unless the fishing is conducted near the shore where the fish are dressed on land, then the manufacturer can oversee every detail, and know that the finished product is not only true to name, but pure in every sense of the word. The rank taste and smell of oil, I believe is principally due to the fact that the livers have not been properly assorted, and freed from other matter. Acting upon this belief, I procured fresh, pure cod livers, and prepared various colored oils, and could detect little or no difference in the odor and taste of the different shades. Samples of these oils are herewith furnished. Upon considerable exposure to the air in warm weather, they have become somewhat oxidized as any oil will, yet even at this lapse of time, about four months, with almost constant exposure, little or no difference is discernable.

These investigations were begun by me, not through any personal, mercenary, or economic motives, but to try and ascertain whether the basic principles which have been extracted by different chemists, are putrefactive products, or not. Preliminary to this line of work, I had devoted considerable time to various kinds of work on cod liver oil. In isolating the basic principles, the general scheme, with more or less modifications, of the French chemists, Gautier and Mourgues, was followed. The great differences of the yield of these principles in the different oils, lead to the idea that these variations were entirely due to the method of manufacture, and further the idea was suggested that, in all probability, the principal part of the alkaloids remained in the livers.

We submit that many subjects are written to death, and there is probably no other product used in medicine which has been handled with and without gloves, so to speak, more than cod liver oil. But in canvassing the literature extant upon the subject, it is fairly easy to discern that many writers and investigators have been guided as much or more by personal motives as for the advancement of scientifie knowledge. This is unfortunate indeed in this instance, when cod-liver oil is known to be of such great remedial value in certain classes of diseases.

There exist many divergent opinions as to the quality and value of different colored cod liver oils, and as to which possesses the greatest therapeutic value. With those who have devoted considerable time and study to the subject, the preponderance of opinion is in favor of the light brown oil, when properly prepared, possessing the greatest amount of efficiency, and my own observations corroborate this opinion.

The question of the inferiority of some cod liver oils being due to admixture of other oils, is one which would furnish sufficient material for an elaborate paper itself, a discussion of which I propose to make in the near future. The fact that no two chemists, not working conjointly, have been able to arrive at the same conclusions would seem to justify the claim that there is much room yet for discussion upon this important subject. Heyerdahl, who has devoted ten years to special investigations and chemical research, claims that none but the lightest colored oils are of any value.

He accordingly publishes a voluminous report replete with structural formulas of hydrocarbon, oxygen, sulphur and nitrogen compounds, with their many derivatives. It seems to me that considerable time must have been devoted to consulting works on organic chemistry in making the compilation which constitutes the greater part of his book. Probably the intent of the publication is to create the impression that a vast number of original investigations have been made. As a compilation of structual formulas on hydrocarbons, etc., the work is quite interesting, and would frequently be found serviceable for reference, but as far as the cod liver oil chemistry is concerned, in the light of the facts pointed out in this paper, it is evident that very little value can be attached to it.

In opposition to these views Dr. Louis De Jongh is equally emphatic in his belief that the light brown oil is the only one possessing marked active therapeutic value. He is, also, supported by the conclusions of the French chemists, Gautier, Mourgues, and Bouillot.

For more than seventy years chemists have devoted more or less study to the quality and composition of cod liver oil, among whom we find Wurzer, 1822; Marder, 1830; Wackenroder, 1838; Herberger, 1839; De Jongh, 1843; Personne, Winckler, Kremel, Hirsch, Gautier & Mourgues, and many others. This report will not deal with the methods of estimating fatty acids, glycerides, etc.

Many samples of oil of different shades of color have been examined for basis principles with various results. These principles when isolated and purified as oxalates, were submitted to the usual alkaloidal reagent tests, as follows:

N/20. Mayer's reagent gave a brownish-yellow precipitate, adhering to the bottom of the test-tube.

Sodium phosphomolybdate, 2 per cent. solution, gave a floculent grayish-brown precipitate.

Sodium molybdate, 2 per cent. solution, gave a greenish-yellow, fluffy precipitate.

N/10. Wagner's reagent gave a dark-brown precipitate.

Picric acid, 2 per cent. solution, gave a yellow precipitate.

Gold chloride, 1 per cent. solution, gave a black precipitate.

Sodium phosphotungstate, 2 per cent. solution, gave a grayish-white fluffy precipitate.

Some of the light or pale oils yielded considerable amounts of alkaloids, but in many instances they were free from these constituents; the reasons for their absence in certain cases are stated in another part of this paper.

Some of the light brown oils yielded as much as .03 to .05 per cent. of the combined oxalates, others, again, only contained traces, while some were free from these elements.

The medium and dark brown oils gave quite similar results, thus indicating a limit to the solvent power of the oils for the alkaloids. Were these constituents held in the oils mechanically or by suspension, it would seem that the darker the oil, the richer it would be in the alkaloids, by reason of an increased specific gravity, and the presence of much extra albuminous matter.

This would be true if the oils were all prepared by the old process, or by the use of low heat. My experiments, however, did not verify this conclusion, and differences in the alkaloidal yield of oils of the same color had to be looked for in another direction, namely, the method of preparing the oil.

In preparing the pale oil by the old time putrefactive process, considerable amounts of alkaloids were obtained, and if the livers were permitted to go through the more advanced stages of putrefaction until the liver tissue or cells were thoroughly broken down and the oil came off brown, these constituents were present in quantities bearing a fair ratio to the color of the oil. The fact that some of the commercial cod liver oils of different shades of color from pale to dark brown, contained none of these basic principles, led to the belief that their absence was due to the method of preparation, and that those oils which did not yield these constituents were prepared by the application of excessive heat; accordingly, oils of various shades of color were prepared from fresh livers. Three series of experiments were made: The first consisted of the extraction of different colored oils by the putrefactive or old-time process. In the second, the different colors were produced by the application of heat at 40° to 60° C., and in the third, 100° to 140° C. of heat was used. The different oils prepared by the application of the low heat, and those prepared by spontaneous exudation yielded about the same amount of organic bases, while those which were prepared by the use of high heat were either free from these principles, or contained them in very small amounts. The lower yield obtained by the use of high heat is accounted for in two ways: First, the desired color of the oil, which is due to the natural coloring pigments in the livers, was obtained before the same degree of disintegration of the liver cells had taken place, as in the case of low heat, and the putrefactive processes, because the heat acted more readily upon the coloring pigments than upon that part of the tissue which contained the basic principles, and secondly, because the heat had a tendency to dissipate the volatile alkaloids, and decompose the others. These two agencies combined

produced considerable difference of alkaloidal yield in favor of the same shade of oil extracted with low heat, or by the putrefactive process. These results tend to the conclusion that these constituents existed in the fresh, undecomposed livers. Accordingly, efforts were made to obtain them directly from the combined liver tissue and oil. To accomplish this, I visited the fishing grounds, and made arrangements with Captains of different fishing schooners at various times and places to take on board containers, chemicals, antiseptics, and all apparatus and appliances necessary to carry out my experiments successfully, thus taking all reasonable precautions to prevent the introduction of bacteria.

These trips were made in the latter part of December and the early part of January, 1894–95, when the thermometer registered from a few degrees below freezing to two degrees to seven degrees below zero, Fahrenheit. In addition to this, some of the shore fisheries were visited, and the livers taken from the fish immediately upon landing the dory. In each case I was present when the fish were caught, and immediately removed the livers, transferring them at once to air-tight receptacles containing various preservative agents. In so doing I obtained absolutely fresh livers, ground them into a soft magma, and divided the mass into aliquot parts, from which I obtained similar oils and extracts by the three methods noted above. In one case I employed steam heat by means of an Arnold steam sterilizer, holding the temperature at 40 degrees to 60 degrees C. The livers were thus carefully protected from the air. In another experiment, direct heat was employed, the temperature being from 100° to 120° C. In the third experiment, the livers were exposed in an open container to the atmosphere of the room for about two weeks. Each batch was examined from time to time for the presence of bacteria. In the first two instances no bacteria were found at any stage of the operation, but in the other experiment they presented themselves in great abundance at about the end of the first week. To fortify my own observations while I had these experiments under way, I submitted samples, at different stages of the operation, to Prof. J. O. Schlotterbeck, of the University of Michigan, who examined them in the bacteriological department of that institution. His notations regarding bacteria agreed with mine. The basic principles of the products obtained by the application of low heat, air excluded, and without the use of heat, were then separated and weighed, and found to be practically the same. The same colored oils from the low heat steam process contained as much of the basic principles as did the oils obtained by spontaneous exudation. There was, however, a decided difference in the flavor or taste and odor of the two oils. The samples obtained by the steam process, and which I have exhibited, being sweet and pleasant, and possessing little or none of the eructation properties of those prepared by the old process. It is scarcely necessary to state that the first oil which comes off by spontaneous exudation is of a pale golden or straw color.

The conclusion to be drawn from these experiments is that brown oil can be prepared in a pure sweet condition, without the intervention of bacteria.

In my own mind I need no further evidence that these so-called alkaloids are not putrefactive products, commonly called ptomaines, but that they are leucomaines, or other organic cunstituents, conducting themselves like alkaloids with solvents and alkaloidal reagents, since I have been able to extract them in a pure state from fresh livers in the same abundance as from decomposed livers. The darker the oil in either case, the more abundant were these constituents, demonstrating that the cell tissue is more thoroughly broken down, allowing them to be taken up mechanically or by solution in the oil.

It is the intention to continue this line of work, and separate and determine the different basic principles.

With the new field for chemical investigation, which is opening up on this subject, it seems somewhat inconsistent that one investigator like Moller, who may have arrived at certain conclusions should claim that all others are wrong who do not agree with him. We are inclined to be liberal, and allow each his individual views until a sufficient number of scientific men arrive at concordant conclusions.

When more than a passing interest has been created from one cause or another, regarding some important medicinal or chemical product, those interested are always astir and on the alert, to gather any new facts connected therewith, and although cod-liver oil has been and is now a much talked about product, yet we have offered these notes with the hope that some good on scientific lines may develop from them.

I wish to say at this point that we of the interior who are not acquainted with the manners and customs of our coast fishermen and fish dealers, have a very incorrect notion of their generous, genial and kind-hearted dispositions. We seem to have acquired the impression that the fishermen particularly were an exceedingly ignorant and inferior class of men, of a brutal disposition. This is only partially true of a very small percentage of those industrious seafarers. A majority of them, even with their cultivated roughness, are the most generous-hearted and accomodating men to be found. In many cases the rough exterior conceals an educated, cultivated and refined intelligence.

I believe that the manufacturers of cod liver oil should have government control for the purpose of protecting the consumer against oils which have been often subjected to the detestable and abominably filthy methods in production, such as I have observed in more instances than one. To this end I think a committee ought to be appointed by individual States or by the United States Government, whose duty it should be to visit the fishing grounds and supervise the methods employed in collecting the livers, to see that manufacturers conform at least to hygienic principles.

It would scarcely be appropriate to cite instances which came under my observation, where the whole mass of livers, intestines, gall sacs, etc., were thrown as one conglomerate mass into containers and medicinal oil extracted therefrom. This condition of affairs would not be so bad were the livers in a fresh state, but they are often in advanced stages of putrefaction, and it would seem almost miraculous if cod liver oil from such sources did not produce disease rather than ameliorate it.

In the light of the present knowledge of the methods employed in manufacturing cod liver oil in different parts of the world, it seems to me to be folly to claim that Norway or any other foreign oil is superior to the best grades of American oil; the methods of foreign manufacturers in most cases being more or less secret, I do not know that they are better than our own improved steam processes; in fact, I believe they are no better, for the finest grades of American oil, when compared with the various foreign oils, possess all the proper characteristics of a high grade oil, with no more objectionable features than the best of these foreign oils, some of which have an inflated reputation because of shrewd and extensive advertising.

The claim, also, that the fish in Norway and other foreign waters are better than ours as a source for high grade oils, because of superior local conditions is not a tenable one, for no finer cod or cod livers can be found in the world than off the American coast; in fact, our cod fish are the largest and most abundant in the world, as statistics will show. and if a large, fat, grayish-colored liver is any criterion of prime quality, our cod livers have no equal.

In conclusion, I claim that, after preparing the different colored oils from absolutely fresh cod livers, obtained from fish as soon as they were taken alive from the trawls, and comparing these oils, as well as the total basic principles to be found in American cod livers, with foreign made and domestic oils, I have no hesitancy in saying that as good oils can be and are made in this country, by modern improved methods as any in the world, and further, that our source of supply is equalled by none both for quantity and quality.

CHINQUAPIN (CASTANEA PUMILA MILL.).

BY HENRY KRAEMER.

More than a year ago Berthelot claimed that with the progress of science the time was coming when synthetic foods, from the laboratory of the chemist, would supply the world with life, instead of the agricultural products which have been used from time immemorial. Beginning with the well-known syntheses of acetylene and urea, he would build up, after the manner of the chemist, the constituents that seem to be the active principles of the plant and animal foods. He believes, for instance, that by reason of the synthesis of the alkaloids of tea, coffee and cocoa, from urea, that these plants will soon follow like madder into economic eclipse. Dr.

Wiley, in his retiring address as President of the American Chemical Society (December, 1894), calls attention to the fact that "no attempt is made to compute the cost of caffeine necessary for a single cup of Java, and that the fact that caffeine is only one of its constituents is naïvely ignored."

However beautiful the work and convenient the results may seem to be to Berthelot and others, it will be necessary for the whole animal creation to undergo marked changes in its digestive organs before they can be adapted to the use of synthetic or concentrated foods or the so-called active constituents of foods. It is extremely doubtful if starch and glutine can take the place of wheat; or, that any of the constituents of our garden vegetables could ever be produced in sufficient quantity to replace them; or, that our fruits could, with due regard to the healthfulness of the race, ever be replaced by synthetic products; or, if myocene, sarcine, karnin, kreatin, etc., could ever replace meat. The human stomach must be nearly filled at least once a day for the individual to be healthy. It is only in the case of invalids that synthetic or concentrated foods will have any avail. Man must have not only carbohydrates, like starch and sugar; hydrocarbons, like fat and oil; nitrogenous principles, like proteids, fibrin, casein, gelatin; salts, like $Ca_3(PO_4)_2$, NaCl, KCl, etc., but he requires crude fibre, cellulose, etc., being the so-called inert constituents of plants to assist digestion, even if they do not impart strength and life. One might as well talk of breathing oxygen alone, because the oxygen alone is required by the blood in changing the hæmoglobin of venous blood to oxyhæmoglobin of the arterial food.

Ever since Joule demonstrated the mechanical equivalent of heat, physiologists have been at work to ascertain the number of foot-pounds of work which the different foods will yield. So that to the different kinds of food are assigned physiological functions: to carbohydrates and hydrocarbons is ascribed the power of begetting force, and from nitrogenous substances is obtained the source of supply in replacing the waste of nitrogenous tissues, while any excess assists the starch and oil in their province of keeping up animal heat. "After the supply of sufficient albuminoid matters in the food to provide for the necessary renewal of the tissues, the best materials for the production of internal and external work are non-nitrogenous matters, such as oil, fat, sugar, starch, gum, etc. When the work is increased not so much extra meat as vegetable food, or its dietetic equivalent, fat is demanded." In view of these statements and facts it seems to the author that any plant that is fairly rich in starch, oil and nitrogen is worthy of at least a record. The author refers to the fruit of the chinquapin (Castanea pumila Mill.), to which he has devoted some attention.

Castanea pumila Mill,* has been variously called by systematic botanists:

* Tenth Census of U. S., Vol. ix., 1880, enlitled Forest Trees of North America.

Fagus pumila, Linnæus; Fagus Castanea pumila, Marshall; Fagus pumila var. præcox, Walter; Castanea nana, Mulhhenberg; Castanea alnifolia, Nuttall; Castanea vesca, Lesquoieaux. It varies from a small spreading shrub to a small-sized tree (15 metres high, with a trunk 0.30 metres in diameter). It has a dark greenish-colored bark, marked transversely with whitish lenticles and elliptical patches of a lichen. The wood is light-colored and marked by broad annular rings. The summer wood contains several rows of large ducts. The young green branches are covered with minute one-celled trichomes. The bark is rather tough, bast fibres numerous and long, taste astringent and is sometimes employed as a tonic. The leaves are elliptical, oblong or lanceolate, acute with rounded base, mucronate-serrate, upper surface smooth, lower surface marked by clusters of long one-celled trichomes. This tomentose character, of the under surface of the leaves, distinguishes the chinquapin from the young chestnut. The leaves are 9 to 15 centimetres long by 3 to 6.5 centimetres at the widest portion.

The flowers are aments or catkins and are of two kinds. The lower are staminate, being 14 centimetres long, calyx 5 to 6 parted, stamens 5 to 20, filaments slender, anthers two-celled, The fertile flowers are above, fewer, and are interrupted. The catkins are 6 to 7 centimetres long, usually one, sometimes two clustered together with an ovoid scaly involucre, covered with trichomes, which in the fruit becomes coriaceous and beset with prickles, and is 4-lobed. Nut is solitary in the burr, ovoid, 11 to 16 m.m. long by 7 to 12 m.m. wide. The bees derive honey from the flowers during early summer (June).

The Chinquapin grows* from Lancaster Co., Pa., and the Valley of the Lower Wabash River, Indiana, south and southwest to Northern Florida and the Valley of the Neches River, Texas. It has been found in Southern New Jersey and the adjoining corner of Pennsylvania along the Delaware River. In the Atlantic States it is reduced to a shrub and attains its maximum development further south. It grows on rich hillsides, borders of swamps, and is especially seen on the borders of roads, clearings, etc. It is suggested as suitable for an economical hedge. It is most common and reaches its greatest development in Southern Arkansas.

The wood of the chinquapin is light, hard, strong, cross-grained, durable in contact with the ground, and liable to check in drying. It equals that of the chestnut. In sp. gr. it is 0.5887; ash, 0.12 per cent., and weighs 36.69 pounds per cubic yard. It has the following strength and fuel value:

Approximate relative† fuel value	58.80
Coefficient of elasticity in kgms per m.m.	1,141
Ultimate transverse strength in kgms.	423
Ultimate resistance to longitudinal crushing in kgms.	7,923
Resistance to indentation to 1.27 m.m. in kgms.	1,887

* Agricultural Department Reports: 1854, 410; 1860. 421; 1868, 281; 1875, 175.

† 1. The fuel value is obtained by burning the wood in a combustion tube in a current

The nuts, or "chinquapins," as they are called, are much sought, and so soon as ripe are eagerly eaten by those who first see them. 88.116 Gms. of whole nuts gave 28.785 per cent. of hulls and 71.215 per cent. of "meat" or kernel. The kernels were cut up and dried in an air-bath at 110° C., and were found to contain 18.17 per cent. of moisture.

For the determination of oil, 15 Gms. of the powdered kernels were extracted in a Soxhlet extraction apparatus, with anhydrous ether for 8 hours. The contents were poured into a large platinum dish, the ether evaporated and the contents weighed.

Weight of platinum dish and oil.....	50,880
Weight of platinum dish alone.....	49,605
	1,275

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of oxygen and determining the per cent. of C from CO_2, collected in the KOH bulb, and the H from the amount of H_2O found in the $CaCl_2$ tube. Then knowing the specific gravity and ash by the usual calculations for calorific value of fuel, the fuel value per kilogram, or per cubic decimeter or approximate relative fuel value of the wood may be calculated.

2. The strength of wood is ascertained by means of "Testing Machines," which may be either for small or large beams. The specimens are first slowly and carefully seasoned. In determining the *Resistance to Transverse Strain* they are generally made 4 Cm. square and are long enough to give the necessary bearing upon the supports. The supports are shod with flat iron plates, and set exactly one metre apart. The specimens are placed upright to eliminate the influence of this weight, and hydraulic pressure is applied by means of an iron rod, acting midway between the supports when the deflection is read. In these tests (see vol. ix. 10th Census of U. S.), the pressure was applied as indicated by the direction of the arrow ——> The pressure is applied slowly and uniformly. The first deflection was at 1173 and the second at 1141 kgms. Formula for *Coefficient of Elasticity* is $E = \frac{Pl^3}{4\triangle bd^3}$. The dimensions l, b, d being expressed in m.m. and P in kgms. The formula for *Modulus of Rupture*, is $R = \frac{3\,Pl}{2bd^2}$. The dimensions l, b, d being expressed in Cm. The modulus of rupture of Castanea pumila is 991, and the ultimate transverse strength in kilograms is 423.

3. In the *Longitudinal Compression Test* the specimens were 4 Cm. square and 32 Cm. long. The specimens were introduced between the platform of the machine and pressure gradually applied until they failed. The figure given represents the number of kgms. required to cause failure.

4. *Resistance to Indentation.* Specimens were 4 Cm. square and 16 Cm. long, and pressure was applied perpendicularly to the fibres. Upon the platform of the machine they were indented with an iron punch 4 Cm. square on its face, covering the entire width of the specimen and $\frac{1}{4}$ of its length at the centre. The results are different according to the direction of the grain when as in the previous illustrations, a pressure of 2395 kgms. produces an indentation of 2.54 m.m., whereas, when the grain is parallel 2608 kgms. = 4.81 m.m., producing a slight shearing of the fibres. The following comparative table will illustrate the value of these figures, and are taken from 10th U. S. Census, which

The percentage of oil then for dried material was 8.50 per cent., or for the fresh chinquapin kernel 6.955 per cent. The starch was determined as follows: 2.000 Gms. of the finely powdered kernels deprived of oil were put into a pressure bottle with 100 C.c. of water, and heated for 8 hours at 130–140° C. It was then allowed to cool to 60° C., and 10 C.c. of HCl (sp. gr. 1.20) added and sufficient water to make the bulk 100 C.c. The bottle was then heated at 60°–70° C. for 2 hours. The contents were then filtered, neutralized and made up to 500 C.c. A portion was titrated with Fehling's solution (5 C.c. = 0.50 glucose). 26.50 C.c. of chinquapin solution completely precipitated 5 C.c. of Fehling's solution, which calculated showed 47.17 per cent. of glucose. This was equivalent to 44.45 per cent. of starch in the dried kernels, or 36.37 per cent. in the fresh kernels.

A nitrogen determination was made by means of the combustion of 1.000 Gms. of powdered chinquapin, and gave 25.2 C.c. of nitrogen. Then from the following data and formula the per cent. of nitrogen was determined:

$$V = 25.2 \text{ C.c.}$$
$$t = 20.5^\circ \text{ C.}$$
$$B = 757.$$
$$f = 17.4.$$
$$p = 0.0012562.\ V.\ \frac{1}{1+(0.00367.\ t)}.\ \frac{B-f}{760}.$$
$$p = 0.0288.$$

From this the per cent. of nitrogen in the natural or fresh kernels was calculated and found to be 2.357 per cent.

One quart of "Chinquapins" were bought in Asheville, N. C., on October 11, 1894, at 10 cents. (They were probably 3 or 4 weeks old.) This quart contained 729 "chinquapins." These were kept until June 1st, 1895, and yielded in all 166 worm-eaten nuts, being in per cent. 22.77.

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is the only comprehensive work in timber physics ever undertaken on American timbers:

Coefficient of elasticity in kgms. on m.m.	Ultimate Transverse strength in kgms.	Ultimate resistance to longitudinal crushing in kgms.	Resistance to indentation to 1.27 m.m. in kgms.	Species.
1658	——	——	——	Larix occidentale.
1141	423	7,923	1,887	Castanea pumila.
971	386	8,183	3,388	Quercus alba.
856	297	6,106	1,698	Castanea sativa var. Americana.
——	541	——	——	Quercus chrysolepis.
——	——	13,767	——	Rhizophora mangle.
——	——	3,395	——	Asimina triloba.
——	——	——	12,689	Canella alba.

This showed that 77.22 per cent. were fit for planting or fit for eating, although a much larger per cent. are eaten at first, as the worm is not given time to develop.

The grub that feeds on the "chinquapins" is the larva (according to L. O. Howard, of the Divison of Entomology of U. S. Dept. of Agric), of a Coleopterous insect belonging to the genus Balanius, and is probably either B. proboscideus or B. rectus.

Conclusions: 1. The Chinquapin contains the following:

Fixed oil (sweet and bland)	6.955 per cent.
Starch (resembling wheat)	36.37 "
Nitrogen	2.35 "

This analysis shows that it contains a fair amount of nutritive properties.

2. The flavor of the chinquapin is equal to that of the chestnut, and is eagerly sought and eaten in the country where it grows.

3. The chinquapin is limited in its natural range to the region from Pennsylvania and Indiana to Florida and southwestward to Eastern Texas. It prefers a permeable, rich rocky soil, but will endure almost any soil except a wet one. (Fernow.)

4. It will yield fruit in the second or third year at least, requires no care, and might be advantageously planted and improved by those who are "land poor" as yielding a profitable investment and immediate returns.

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ANALYSIS OF KOLA.

BY JAMES W. KNOX, PH. C., AND J. O. SCHLOTTERBECK, PH. C., B. S.

This analysis of kola was made according to Parsons' method (Prescott's Org. Analysis, pp. 408–422) with such modifications as were found necessary.

The sample used was prepared by grinding up a quantity of fresh kola seeds, drying in air, and reducing to about a No. 60 powder. As such it had a brick red color and a rather fragrant odor somewhat resembling that of theobroma cacao; the color did not exist in the fresh seeds, but appeared as soon as comminution was begun.

Determinations of moisture of fresh kola, and of moisture, ash, nitrogen, alkaloids, proteids, fat, volatile oil, tannin, sugar, and starch of dry kola were made. No attempt was made to obtain total composition in percentages of every constituent.

MOISTURE AND ASH.

Determined in usual way. Moisture of fresh kola was 51.41 per cent.; of dry kola, 6.3 per cent. Ash amounted to 3.35 per cent., of which 79.7 per cent. was soluble in water and the residue in hydrochloric acid; it was composed of carbonates, sulphates and chlorides of potassium, sodium,

and magnesium. Quantitative determinations of these constituents were not made.

NITROGEN.

Determined by Gunning's modification of Kjeldahl method. (U. S. Dept. of Agriculture, Division of Chemistry, Bulletin No. 35, pp. 200–203, 1892.) Total nitrogen, 1.675 per cent.

ASSAY OF KOLA.

Ten grammes treated for ten hours with chloroform in a Soxhlet continuous extraction apparatus yielded after purification of the chloroformic extract by the "shaking out" process 1.77 per cent. of total alkaloids. A trace of coloring matter was present in the alkaloids.

To avoid the loss caused by the "shaking out" process, the chloroformic extract from another ten grammes of kola was mixed with about ten grammes of magnesia and percolated with ether in a Soxhlet apparatus for about six hours. This yielded apparently very pure alkaloids, white and finely crystalline, amounting to 1.81 per cent.

By still another method, nitrogen of the chloroformic extract from ten grammes of the drug was estimated by Gunning's method; the wax-like, non-alkaloidal matter present was found by another determination to be practically non-nitrogenous. Multiplying the nitrogen by its caffeine factor, the result was the highest obtained, 1.86 per cent. It seems that this should be an absolutely correct method if properly carried out. It is obviously more accurate than the "shaking out" process, which is wasteful for caffeine.

SEPARATION OF CAFFEINE AND THEOBROMINE.

Caffeine is the principal alkaloid of kola, but Heckel and Schlagdenhauffen (*Sur les Kolas Africains*) claim to have found a small percentage of theobromine also. A separation of theobromine from caffeine was attempted by means of its insolubility in benzene. .375 Gm. of the purified alkaloids of kola was placed in 60 Cc. cold benzene and agitated occasionally; simultaneously .375 Gm. pure caffeine was subjected to the same treatment. In two hours the mixture of alkaloids was found to have been completely dissolved, except a minute quantity of a white powder in the bottom of the beaker. The pure caffeine in the other beaker had completely dissolved. At the end of another hour the sediment in the first beaker did not seem to have diminished in quantity, and was rapidly filtered, washed, dried and weighed. Its weight was .0072 Gm. or 1.92 per cent. of the total. If this be considered as theobromine, the percentage of it in kola is .0357. This residue was not tested qualitatively, and its insolubility is the only reason for considering it theobromine.

Wm. E. Kunze (Fresenius' Zeitschrift für Analytische Chemie, January, 1894) describes a simple and delicate method for the separation of theo-

bromine from caffeine and its quantitative determination. An ammoniacal solution of theobromine and caffeine (or of theobromine alone) is heated to boiling, a solution of silver nitrate is added in excess and boiling continued until all the ammonia is driven off and precipitation is complete. An atom of silver is substituted for the third hydrogen atom of theobromine, insoluble theobromine-silver, $C_5H(CH_3)_2AgN_4O_2$, is precipitated, white, and finely crystalline. It is filtered, washed with hot water, dried and weighed. The weight $\times$ .627 = weight of theobromine. Or the metallic silver may be estimated and its weight $\times$ 1.666 = weight of theobromine.

The author reports remarkably close results obtained alike from theobromine and mixtures of theobromine and caffeine. In experiments made during the progress of this analysis quantitative results were obtained, although not as close as those announced by the author.

The mixed alkaloids of kola were then subjected to the same treatment, but in quantities of from .200 to .400 Gm. no evidence of theobromine was given; then a mixture of .300 Gm. caffeine and .006 Gm. theobromine was tested and a distinct precipitation of theobromine-silver took place. To another mixture of kola alkaloids, a small unweighed portion of theobromine was added and the whole then tested. Again the precipitation was prompt, showing that there was no interference from other causes.

GLUCOSIDE OF KOLA.*

The presence of a glucoside in kola which, by its decomposition yields caffeine, has apparently been established by Heckel by numerous experiments made on the drug after it has been completely exhausted by chloroform. C. O. Topping (Proc. A. Ph. A., 1894, p. 178,) conducted similar experiments successfully, and in this work verification of those results was obtained as stated next below.

Three samples of 5 Gm. each of "exhausted" kola were digested respectively with water at 100° C. (I.), cold water (II.), and 1 per cent. hydrochloric acid (III.) for twelve hours, then assayed in the usual way. Below is given a comparative statement of the results with those of Heckel. Yield of alkaloids:

	I.	II.	III.
	.0238	.028	.0688
Heckel	.021	.042	.072

Upon the interpretation of these results, and as to the certainty of there being in kola a glucoside yielding caffeine, we do not enter at the present time. We desire to do further work upon this question.

* We have no knowledge of the isolation of this glucoside, the evidence of its existence being indirect.

PROTEIDS.

Estimated by multiplying difference between total nitrogen and alkaloidal nitrogen by 6.25 (Parsons).

Total nitrogen = 1.675 per cent. Alkaloidal nitrogen = .519 per cent. Difference 1.156 per cent. × 6.25 = 7.225 per cent. proteids.

FAT.

Residue from chloroformic extract insoluble in water, dilute acid and 80 per cent. alcohol was recorded as fat (Parsons), and comprised .735 per cent. of the drug. In another experiment carbon disulphide proved a good solvent for the fat. Nearly the same results were obtained with it, and it removed only a small amount of the alkaloids. The fatty body is at first cream-colored, but changes rapidly to yellowish-brown on exposure to air.

VOLATILE OIL.

To the dried and weighed chloroformic extract 100 Cc. water were added and the mixture evaporated to dryness over a water-bath and again weighed. According to Parsons the loss of weight may be recorded as volatile oil. This ranged from .09 to .07 per cent.

Attempts were made to separate the volatile oil by distillation of the drug with water, but kola contains a large percentage of starch, and on being boiled the starch granules are ruptured, forming a thick gelatinous mass which cannot be broken up by further boiling. The experiments for that reason were unsuccessful.

TANNIN.

Löwenthal's (volumetric) method as modified by Proctor and others was used (U. S. Dept. Agriculture, Division of Chemistry, 1892, Bulletin 13, part VII, "Foods and Food Adulterants," p. 890; Prescott's Organic Analysis; Allen's Organic Analysis). Tannin = 3.15 per cent. For qualitative tests tannin can be separated by precipitating with lead acetate, removal of lead from precipitate by prolonged treatment with hydrogen sulphide, and adding alcohol, which dissolves the liberated tannin.

SUGAR.

Estimated gravimetrically (Allen's Organic Analysis I, 225–227) by Fehling's solution, tannin, etc., having been removed from the infusion by precipitation with lead acetate and subsequent removal of excess of lead from filtrate by precipitation with hydrogen sulphide. Glucose = 3.872 per cent.

STARCH AND ISOMERS.

Estimated by inversion and determination of total sugar. From this the glucose of previous determination was subtracted and the remainder × .9 starch and isomers. This was 35.26 per cent.

Below is given a tabulated statement of the analysis:

Moisture (fresh seeds)	51.41
Moisture (dry seeds)	6.30
Ash	3.35
Nitrogen (total)	1.675
Caffeine	1.83
Theobromine (?)	0.0357
Proteids (from total nitrogen)	7.225
Fat	0.735
Volatile oil	0.09
Tannin	3.15
Sugar	3.872
Starch and isomers	35.26

Ann Arbor, Mich., June 15, 1895.

LABORATORY NOTES ON PEPSIN, COCA LEAVES AND IPECAC ROOT.

BY LYMAN F. KEBLER.

PEPSIN.

Very few analytical processes are as unsatisfactory as that employed in determining the digestive power of pepsin. I have frequently questioned the value ascribed to this preparation, but L. A. Harding* would have us understand that pepsin does not possess any proteolytic action at all, and that the present accepted method for testing it is a snare and a delusion.

I have frequently conducted blank experiments while estimating the strength of pepsin, and at no time have I ever observed anything like that reported by Mr. Harding. The solubility of albumen in hydrochloric acid is well known, but the results, referred to above, appear to be phenomenal. After reading the communication, several trials were made, employing larger and smaller quantities of albumen. When only a small amount of albumen was employed, none apparently was dissolved, but when a larger amount was used an appreciable quantity appeared to be taken into solution, as was proven by the several reagents.

It is well understood that the present method is only accepted for want of a better one, and as soon as a satisfactory process can be devised, it will be hailed by all analysts.

During the past year I have examined twenty samples according to the U. S. P. process with the following results:

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* 1895, Am. Druggist, 26, 101.

No.	Digestive Power.	Reaction.	No.	Digestive Power.	Reaction.
1	1—2250	Acid.	11	1—3000	Acid.
2	1—2500	"	12	1—3000	"
3	1—3000	"	13	1—2000	"
4	1—3000	"	14	1—2500	"
5	1—2300	"	15	1—1800	"
6	1—3000	"	16	1—3000	"
7	1—3000	"	17	1—3000	"
8	1—2000	"	18	1—3000	"
9	1—3000	"	19	1—3000	1 Gm. required 3.23 C.c. of $\frac{N}{1}$.KOH.
10	1—3000	"	20	1—3000	1 Gm. required 2.34 C.c. of $\frac{N}{1}$.KOH.

Numbers 19 and 20 appeared to be extremely acid, but were beautiful preparations.

COCA LEAVES.

Having for some time experienced considerable difficulty in obtaining a fluid extract containing 0.5 per cent. of alkaloids, even when leaves containing 0.6 per cent. of alkaloids were employed, I determined to make an investigation. Thinking that the method I employed was not suited for both the leaf and fluid extract, I made a careful comparison of the most promising methods, with the crude drug itself. The methods of Dr. Squibb*, Dr. Lyons,† Mr. Marck,‡ Mr. Pfeiffer,§ and Mr. Keller‖ were chosen. The results were as follows:

Authors.	Gravimetric.	Volumetric.¶	Time.
Dr. Squibb	0.75	0.67′	3 days.
Dr. Lyons	0.532	6.516	24 hours.
Mr. Marck	0.64	0.485′	1 week.
Mr. Pfeiffer	.....	0.58	10 hours.
Mr. Keller	0.56	0.536	2 hours.
Mr. Keller	0.62	0.563	24 hours.

The method of Dr. Squibb certainly claims first place, so far as a large yield is concerned, but I have never been able to obtain the full yield in the fluid extract as indicated by the assay of the drug, and considerable time is assumed.

Mr. Pfeiffer's method is crude and inelegant. Great care must be exercised to completely remove all the alkali used in the process.

* Ephemeris, page 784.

† Pharmaceutical Assaying, page 74.

‡ Analyst, 14, 115.

§ Chem. Ztg., 11, 783 and 818.

‖ See Report of Committee on Indicators, Am. Pharm. Assoc., 1895.

¶ Indicator, Cochineal.

Mr. Marck's process consumes too much time, and the results are unsatisfactory. Notice the great difference between the gravimetric and the volumetric results.

The methods of Lyons and Keller speak for themselves. Both are effective, easy of application, very concordant and, consume little time. I prefer Keller's process, as it is less liable to emulsify, and is more applicable to fluid extract.

My attention was next turned to the fluid extract itself. One hundred pounds of drug, 0.56 per cent. assay, was percolated with the U. S. P. menstruum, the fluid extract assayed only 0.43 per cent., a loss of 25 per cent. of the alkaloids. The following experiments were then made: A coarse powder was prepared, and two portions extracted, one with dilute and the other with 65 per cent. alcohol. The remainder of the coarse powder was then reduced to a fine powder, and two portions treated with menstrua of the same strength as the above. A third portion was exhausted with dilute alcohol containing 0.2 per cent. of tartaric acid. The results are reported in the table below. The coca leaves yielded by Keller's method 0.32 per cent. of alkaloid. These results were obtained by Keller's process.

Coca Leaf.	Menstrum	Per cent. of alkaloids in Fluid Extract.
Coarse	Dilute alcohol.	0.18 and 0.18 per cent.
Coarse	65 per cent. alcohol.	0.18 and 0.20 per cent.
Fine	Dilute alcohol.	0.20 and 0.22 per cent.
Fine	65 per cent. alcohol.	0.27 and 0.30 per cent.
Fine	Dilute alcohol.*	0.18 and 0.20 per cent.

These experiments prove that dilute alcohol extracts the alkaloid only partially from both coarse and fine powders; dilute alcohol, with 0.20 per cent. of tartaric acid, is an unsatisfactory solvent, and 65 per cent. alcohol exhausted the fine drug completely, but exhausted the coarse drug only partially. These results show that a fine powder and 65 per cent. alcohol are necessary to prepare a fluid extract containing all the alkaloids originally contained in the coca leaves as obtained per assay.

IPECAC ROOT.

A sample of ipecac root was assayed by a number of the most promising methods. The methods are compared gravimetrically and volumetrically. The results are as follows:

* Contained 0.2 per cent tartaric acid.

Authors.	Gravimetric.	Volumetric.§
Lyons*	1.99	1.90
Flückiger †	1.73	1.60
Keller‡	2.27	2.16

Flückiger's method gives unsatisfactory results; Lyons' process gives fair results, but Keller's method for ipecac undoubtedly stands without a rival.

Philadelphia, Pa., August 8, 1895.

* Pharmaceutical Assaying, page 110.

† Pharm. Ztg., Jan., 1886.

‡ See Report of Committee on Indicators, Am. Pharm. Assoc., 1895.

§ Indicator, Cochineal.

MINUTES

OF THE

SECTION ON PHARMACEUTICAL EDUCATION AND LEGISLATION.

FIRST SESSION.—MONDAY MORNING, AUGUST 19.

Professor Beal occupied the chair at the request of President Good, who thereupon read his annual address as follows:

Fellow Members of the American Pharmaceutical Association: Very properly the work of this Association is three-fold, scientific, educational and commercial. To the latter idea we must give heed if we would have the sympathy and the endorsement of a majority of our members, but the educational features of our work, that to which this Section is devoted, has of late years become especially interesting and important.

To consider carefully and conscientiously the preliminary education of the pupils is an imperative duty on the part of the Colleges of Pharmacy if they would secure for their teaching the best results.

We, as a nation, pride ourselves on our systems of education, public and private; the percentage of illiteracy is at the minimum with us, in comparison to other nations, we say, but yet in our intercourse with men in the same line of business with ourselves, we are often made painfully aware of the lack of general education and culture among us. This condition of things is discouraging to those in any way connected with a school of pharmacy. A faultless examination paper, considered in reference to the chirography and orthography, is the exception, consequently any preliminary examination for admission to one of our colleges, which would demand all that the candidate ought to know of the several fundamental branches, would reject a considerable number of the applicants. Some *must* be rejected. Others might possibly be conditioned. Unless a young man has a fairly good common school education and is intellectually alert, he cannot appreciate what is taught in a school of pharmacy, and is an undesirable student. As a man he will appear at a disadvantage in any circle of intelligent men and women; as a pharmacist, in communication with his fellows or with physicians, who, as a class, are cultured and educated, he discredits his profession.

If the Boards of Pharmacy generally be given the authority to register apprentices as such, and fix a minimum standard of educational qualification we may hope to have better material to work upon than is now presented. The Colleges of Pharmacy are in accord with what I have said on this point and subject candidates for admission to a preliminary examination. It is an open question whether or not the teachers or officers of the

institution before which the candidate appears for admission should conduct the examination.

Much has already been said on this subject; much must still be said and repeated until the condition of which we complain has been remedied. In considering the authority which may be conferred upon Boards of Pharmacy in the matter of the registration of apprentices, it may be well to remember that scarcely one-tenth of the young men who go into drug stores ever enter a school of pharmacy, but it may not be too much to expect of the future that the State laws controlling the practice of pharmacy may make the conditions for its practice similar to those which control the practice of medicine.

It is too much to expect, at present, that the highest grade of certificate issued by a Board of Pharmacy shall be based upon a diploma of a college, supplemented by examination by the Board. But this is something for which we, in coöperation with the different Boards, may work.

One aspect of the struggle we must not forget. It is, that notwithstanding our protestations to the contrary, legislators are inclined to look upon all attempts to pass pharmacy laws as efforts to confer benefits upon the pharmacists themselves, rather than to protect the public against incompetency. In the matter of pharmacy laws and in the requirements for registration and graduation, a degree of uniformity is desirable.

A national law controlling the practice of pharmacy in the different States, is, by good authority, regarded unconstitutional, but an effort might and should be made to bring the various State laws into harmony and to provide for the interchange of certificates at the discretion of the several boards. One good law might be copied by all of the States, thus making it practically a national law. It would be in order for this Section to prepare such a model law. Once it has the prestige of adoption by two or three States it would not be so difficult to get favorable consideration by other State legislatures. We must not be discouraged, notwithstanding the fact that from these bodies we frequently get more than we ask and something different. The country doctor is ubiquitous and numerous in these bodies. He is an oracle in his own section; to question his authority or his superior wisdom is to slander him. He generally manages to inject something favorable to himself into all pharmacy laws, and either by courtesy or influence he is likely to get what he asks.

Legislation will not, as some suppose, remedy all evils real and imaginary; something is to be left to time and the sense of fairness and justice innate in the American people; but it is encouraging to know that improved laws have been passed during the year for Illinois, Missouri, New Jersey and Wisconsin, and a law for Vermont which has heretofore had none. In Indiana well-meant efforts have again failed. A statistical report on this subject will be presented by the Secretary.

The "Draft of a Proposed Pharmacy Law," published by Professor Oldberg last March, is very carefully prepared and contains many admirable features. Our "model law" must be condensed, clear, yet withal comprehensive.

The conviction that it is to the best interests of the colleges that diploma distinctions be abolished in the registration of pharmacists, has been reluctantly acknowledged by many of the teachers. Realizing that the burden of securing pharmaceutical legislation in the past has fallen largely upon the colleges, placing their diplomas under a ban seems now ingratitude. The medical colleges receive better treatment at the hands of the law-makers, they argue. But if we are to judge by the signs of the times, diploma distinctions are likely to be abolished by the State Boards of Health also. Safety lies in that direction, and good judgment points that way.

What degree or degrees the colleges shall confer is just now a question of absorbing interest. It would seem as though with "Graduate in Pharmacy"—"Ph. G.," there is carried sufficient distinction for the ordinary pharmacist or modest drug clerk. It is certain to satisfy men of conspicuous ability, for great men have little liking for titles.

"Ph. C." and "Ph. M." mean more (or at least they *should* mean more), and when earned they are very properly bestowed. About the degree of "Doctor of Pharmacy," I find my expression of one year ago still reflecting my opinion, although the abbreviation "P. D.," instead of "Ph. D.," prevents the confusion in writing. Druggists are quite generally dubbed doctors by the public, we know, but that is hardly a sufficient reason for conferring the degree.

The title "Doctor," when not applied to a practitioner of medicine, which a druggist is not, is a university degree, and carries with it honor or distinction, gained by superior scholarship either in letters or science.

Aside, perhaps, from a simple expression from this Section, the degree to be conferred and what shall lead up to it will be left largely, perhaps wholly, to the judgment of the individual colleges.

What shall be the length of the terms, how many of them, and what amount of practical experience shall be considered the minimum in conferring each and every one of these several degrees? In a certain sense the amount of instruction given in any branch can be calculated mathematically by the time devoted to it; however, the *actual* amount imparted will be as variable as the teachers. Yet, Mr. A's ability to teach more of a subject in fifty hours than in twenty-five, can hardly be doubted, and it is in order for us to suggest to him the advisability of devoting to it the longer time.

The number of terms may properly be decided by the title to be conferred; for those meaning most, the longest time should be devoted to acquiring it. The degree "P. D." should not be conferred for a course of only two terms. The experience requirement should be dropped, say some of you. Data in regard to it, we must admit, are sometimes unsatisfactory, but if it be possible for Boards of Pharmacy to secure them, the same means must be open to the officers of a college.

The difficulties to be overcome do not seem to me to be so great as to justify us in setting aside the requirement. Give a young man a good general education, and if he expects to make a druggist of himself, is there any doubt that the best possible preparation for the college course is the preliminary knowledge gained by handling drugs?

We may not close our college doors to the applicant who has had no drug-store experience; but do we not show ourselves his friend when we advise him to gain it before he enters a school of pharmacy?

If he should graduate without it, the problem likely to confront him will be to find an employer who will agree with him as to the value of his services. There is a limited demand for pharmaceutical chemists, and the employment is pleasant and profitable to those capable of doing the work. There will be many not adapted to it. There will, we hope, always be a demand for intelligent, reliable, practical druggists; and there is no possible way for them to acquire much essential knowledge except by contact with the public and by work behind the counter of the drug-store. On this point we are all agreed. We differ as to the order to be followed in acquiring the knowledge.

Professor Prescott, in a recent paper, puts the matter well when he says: "I am not a stickler for any one set order in the succession of studies in the school, or of practice and study in a profession. To get both practice and study, sooner or later, in any order, is the main thing. The eager determination of the man is worth more than any logical sequence in his studies. Men who have that steadfast will for education that they mean to get it if they have to take it all wrong end foremost, are the men who are sure to succeed." The important question seems to be: Shall we, when we confer the degree of "Graduate in Pharmacy" upon a man, wholly vouch for him, or shall there be an understood reservation? We must respect an honest difference of opinion on this point. The difference forebodes a division of the schools into two classes. This outcome is preferable to a compromise, were the latter even possible. There is legitimate work to be done by both. Students will find their way into the institutions which offer to them, in-

dividually, the most desirable curriculum. The most of those seeking the degree, "Ph. G." will probably be drawn toward the college of pharmacy of the original type; candidates for the more ambitious titles it is likely will be more evenly distributed. After graduation each will find his level, and the responsible duties will fall to the man best able to perform them.

If the question of a change in the "requirements for graduation" is to be seriously considered by any school, its alumni are entitled to be heard in the matter. If the diplomas are to mean something different and something less, they will most likely object, and the younger of them will give the date of their diplomas, if recklessness should prevail over their conservatism. It is to their interest that these documents shall continue to have their original meaning and value. A degree *does* carry weight with the uninformed, and just so much as a graduate in pharmacy lacks the ability to safely conduct the business of an apothecary and do his work, to that extent is the public, for a time at least, deceived, and finally all who hold the degree suffer in consequence of the public verdict. Whatever is approved or recommended by us, to carry proper weight, should be endorsed by a large majority vote. We do not pretend to be in a position to dictate to the Colleges of Pharmacy, but the action of this Association on matters of education will have a strong moral effect, we trust. Some kind of expression is expected of us. The action should be the result of wise, temperate and considerate judgment. Men of one idea are not safe leaders (sometimes the idea is a wrong one), but if they have a glimpse of the truth they generally have the courage to persevere, having faith that if they be right the majority will come ultimately to their way of thinking. Our methods must not be copied after any European model; not that we should not avail ourselves of any valuable hints given by these older institutions, but our system must be adapted to the needs of Americans, and it therefore will itself be American. Increased emphasis has come to be placed on laboratory instruction, and very properly so. The *art* of pharmacy should be taught, as well as a knowledge of the subjects involved. A person whose brain alone is educated never knows what to do with his hands.

During the year the pharmaceutical journals have all done their part in the work of educating pharmacists; and in this connection "The Study of Pharmacy" series, now being published by the "Pharmaceutical Era," is deserving of recognition by this Section and entitled to special mention. The papers are all by teachers of conspicuous ability and national reputation, and each writes upon a branch of the subject with which he is most familiar.

There is no lack of work for this Section to do. What we have mapped out is far-reaching. We have not realized to the extent of our ambition, but if we have indicated an outline of admitted progress we have worked to some effect.

Without pretending to discuss exhaustively a few of the questions which are pressing for solution, I have called attention to them with such brief comment as will indicate my own attitude toward them.

We cannot hope to settle them here and now, and to the satisfaction of all, but to the end that something satisfactory may be finally accomplished, the following suggestions for the future are submitted:

1. Amend Art. 1, Chap. VII of the By-Laws so as to increase the size of the "Committee on Pharmaceutical Legislation and Education" to five members instead of three. This will give opportunity for fuller representation of the Colleges and Boards of Pharmacy on that committee. The selection of associates might properly be left to the chairman and secretary elect as they now are. Article VIII. of the same chapter prescribes the duties of this committee, and they are by no means light. The Secretary this year has, as the result of considerable labor, some valuable statistical information to present. The work thus well established should be continued and perfected, if possible. If the future committees are a little less ambitious and attempt one thing at a time, that

is, pursue one object to something like a satisfactory conclusion, ultimately it is to be hoped positive good may be accomplished. The distribution of the work might be something after the following order: Make systematic efforts to improve and correct the educational conditions or requirements; correct faulty legislation; suggest grades in the examination of pharmacists and assistant pharmacists; make an effort to bring the matter of apprenticeship under the control of the Boards of Pharmacy; suggest the proper requirements for admission to the colleges, etc., etc. Interest as to work, expectation as to results, and a desire to influence them, will stimulate effort on the part of the members and bring a good attendance at our meetings. State associations could express themselves, and weight would be given to final action.

The Secretaries of the Boards of Pharmacy should be especially requested to keep complete records of the qualifications of applicants.

While we are waiting for the unanimous enactment of that "model law," we may profitably work for the improvement of those now in force.

To pay the necessary expenses of all Boards of Pharmacy and to provide for the prosecution of offenders (and if we fail in the latter the law is a farce), a fund is necessary. To this end an annual registration should be a feature of the law. For this a small fee, say one dollar, should be charged. The record of the Secretary of the Board is by this means revised, and none are carried as druggists in good standing under the law who are dead, "gone out of business," or "left the state."

The existence of four Boards of Pharmacy in one state, as is the case in New York, we think cannot be wholly satisfactory to the druggists, however it may be regarded by these bodies themselves. A more nearly uniform requirement for all sections of a state is likely to prevail if the matter is under the control of one Board. The professional relation of physicians and pharmacists can scarcely be influenced by legal enactment, but good might be the outcome of fixing a legal relationship, and suspicion and jealousy give place to an era of good feeling, firmly established.

Since by the Pharmacopœia all quantities are expressed in the terms of the metric system of weights and measures, and since the convenience and simplicity of this system are rapidly gaining recognition, to hasten the time of general adoption I recommend that Congress be asked to pass a law, making it, after a brief period of years, *the only* legal system for use in the Customs service.

To do effective work in this direction, let there be appointed a committee consisting of one from each state in which we have a member or members, whose duty it shall be to labor with congressmen to this end. We may look for early and favorable action on this subject by the British Parliament.

These thoughts and recommendations I leave with you for your considerate judgment, and such action as you may deem proper.

Mr. Sayre moved that the address of the Chairman be received, and that the recommendations therein contained be approved by this Section.

Mr. Alpers offered an amendment to said motion, that the recommendations contained in the address be referred to a committee of three to report at a later session of this Section.

The amendment being accepted by Mr. Sayre, the motion as amended was adopted.

The Chairman announced that he would appoint the committee later in the day.

Chairman Good having resumed his place in the chair and the reading of reports being then in order, Secretary Hallberg read his report on Poison Statistics as follows:

DEATHS FROM POISON FROM THREE STATES AND VARIOUS CITIES, REPRESENTING ABOUT ONE-SIXTH OF THE POPULATION OF THE UNITED STATES. PERIOD ONE YEAR, RANGING FROM 1893–1894.

		Accidental.	Suicidal.	Acids. Homicidal.	Sulphuric.	Nitric.	Oxalic.	Carbolic.	Hydrocyanic.	Potassium Cyanide.	Alcohol.	Amyl Nitrite.	Potassium Chlorate.	Chloral.	Chloroform.	Potassium Bromide.	Arsenic. Rough on Rats.	Paris Green.	Mercury. Corros. Chloride.	Iodide.	Phosphorus.	Opium. Tincture.	Morphine.	Paregoric.	Cocaine.	Narcotic.	Aconite.	Colchicum.	Digitalis.	Benzene.	Creosote.	Strychnine.	Ammonia.	Potash.	Lye.	Gas, Illuminating.	Gas, Coal.	Zinc Sulphate.	Unknown.
Ark.	No returns in entire State.																																					
Cal	San Francisco	18	20	..	..	1	..	9	..	2	..	..	..	.	..	..	1	3	..	..	..	3	1	10	..	..	..	2	..	..	..	..	6						
Col	Denver	18	14	..	..	..	..	4	..	1	8	..	..	1	..	..	1	..	..	..	..	7	..	8	..	..	..	..	..	..	..	..	1	.....	..	..	1			
Conn.	Naw Haven[1]	10	11	..	..	..	..	2	..	..	..	..	..	1	1	..	1	4	1	1	..	2	2	..	..	..	..	..	..	..	..	1	.....	..	..	3	1		
D. C.	Washington[2]	13	5																																				
Ga.	Atlanta, no statistics.																																						
Ills.	Chicago[3]	50	115	1	..	..	..	34	..	1	..	..	..	..	2	..	5	16	6	..	1	5	6	6	..	..	5	..	..	..	..	1		1	..	..	..	..	4
Ky.	Louisville, '91–'94[4]	7	30	1	..	..	..	..	..	..	1	1	..	2	1	..	2	..	1	..	..	6	2	22	..	..	..	..	..	1	..	..	1	.....	..	1				
Md	Baltimore	16																																					
Mass.	Entire State	30	74	4	..	..	..	..	..	..	..	..	..	..	..	..	13	..	..	..	..	..	18	..	..	..	..	..	..	..	..	..	..	.....	..	..	27	..	..	46
Mich.	"	28	14	1	..	..	..	5	1	..	..	..	..	1	3	..	..	..	3	..	..	1	..	1	8	..	..	..	..	..	..	..	1	.....	..	..	..	..	..	8
Minn	Minneapolis[5]	15	18	..	..	..	..	4	..	..	1	..	1	1	2	..	2	..	..	..	1	1	1	11	..	..	..	1	..	..	..	..	4	.....	..	2	..	..	..	1
Mo	Kansas City.[6]																																						
	St. Joseph	....	8	..	..	..	..	..	..	..	..	..	..	..	1	..		..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	3	.....	..	..	..	..	..	2
	St. Louis	14	46	..	..	..	..	8	..	..	2	..	..	..	1	..	2	7	3	2	..	2	2	24	..	1	..	..	..	..	1	1	..	1	..	2				
Mon.	Helena	....	1	..	..	..	..	..	..	..	..	..	..	..	1																								
N. Y.	Albany	....	1	..	..	..	..	..	..	..	1																												
	Cohoes	....	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1																
	Troy[7]	1	....	..	..	..	..	..	..	..	..	..	..	..	1																								
	Brooklyn	12	50	..	1	..	1	19	..	2	..	..	..	..	..	..	28	1	2	..	..	1	2	..	..	..	1	1	1	..	..	..	1	.....	1	..				
N. Dak.	Grafton, no cases.																																						
Ohio.	Cincinnati	1	27	1	..	..	1	2	..	2	..	..	..	..	..	..	4	2	10	..	..	..	..	7	..	..	..	..	..	..	..	1							
	Cleveland	13	69	..	..	..	..	13	..	..	..	..	..	..	..	..	10	5	4	..	..	..	..	18	..	..	..	..	..	..	..	..		.....	..	..	..	..	..	32
Pa.	Pittsburgh, '93–'94[8]	24	41	..	..	..	1	6	..	..	1	..	..	1	..	1	4	8	8	..	1	..	..	15	4	1	..	3	1	..	..	..	..	Lin.	1	..	..	..	..	6
S. C.	Charleston	1	1	5	..	..	..	1	..	..	..	..	..	..	..	..	2	3	..	..	..	..	1																
Wash	Tacoma[9]	....	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1																
Wis.	State, 45 entire	15	30																																				
	Milwaukee	....	....	..	..	..	..	5	1	1	..	..	..	..	1	..	1	1	....	..	..	..	..	4																
Wyo.	Laramie, no records.																																						
	Total	285	577	13	1	1	3	112	2	9	14	1	1	7	14	1	75	50	39	3	1	4	46	31	126	1	1	9	5	1	1	1	1	21	3	1	5	31	1	1	99

[1] Winslow's Soothing Syrup, one case. [2] Classified: Accidental: corrosive, 2, narcotic, 11; Suicidal: corrosive, 4, narcotic, 5. [3] Only suicidal classified. [4] Three cases not classified as to accidental or suicidal. [5] Record for 4 years. [6] No case of poisoning during Coroner's term of office, June to July, 1895? [7] Physician took 1 oz. chloral for potassium bromide and died within 15 minutes, despite medical aid, stomach pump, etc. [8] One case each from embalming fluid, Gross' Neuralgic Pills, Dr. James' Cherry Tar Syrup, toadstools. [9] Favorite method, revolver.

In connection with the written report, the Secretary made the following verbal explanation:

"There was no report on legislation by the Secretary for the year 1894, consequently it devolved upon me to make a report extending two years back, and I think I have a fairly complete report up to June of this year. I might, say, however, that it is exceedingly difficult for the Secretary to obtain any information, especially from members of the Boards of Pharmacy, and they seem to think that if their notice has been sent to a journal once, that is all that is necessary. It is impossible for the Secretary of this Section to keep track of everything that is going on in the way of legislation in this country, unless he is personally advised of it. In conclusion I would like to request the members of the State Boards of Pharmacy to be a little more prompt in responding to requests for information of this character."

THE CHAIRMAN: I would state that the Special Committee appointed to take into consideration the condition of pharmaceutical education has not yet completed its labors, and asks further time. The Special Committee on Outline Course also asks for further time.

Mr. Prescott moved that the report of the Secretary be received and referred to the Publication Committee, and then said: "I would like to ask what is the degree of completeness or incompleteness of the United States census reports on this subject."

MR. HALLBERG: That of 1890 is the last census. After having drafted the queries in that way, we did not think that we ought to go back five years. I must say that my attention was first brought to this subject about a year ago in an abstract from the United States census, wherein it was stated that for the first time the suicides by poison led, and that is what caused me to take up this subject. I had the figures, but I haven't them now.

One member took the position that acids are not in themselves poison.

THE CHAIRMAN: I would say that my definition of poison is any substance which in small quantities is capable of producing death. I do not know that my definition will be accepted, but that if acids will produce death by being taken into the stomach in small quantities we must consider them, for convenience at least, poisons.

The Secretary stated that the answer to the query as to the tabulation of poison laws, etc., was not quite complete, and continuing, said:

"We have collected quite a number of important points, however. Some of these are to the effect that some States have no poison law. Originally, before the advent of pharmacy laws which contained poison sections, as you know, poison legislation was represented in the criminal code. Upon the enactment of pharmacy laws, some States did not enact poison sections, but left the poison law to the criminal code. Now in the changes that these pharmacy laws have undergone, sometimes the poison section has been introduced, sometimes it has been eliminated; and that is the case in Illinois. We have a law with a poison section. It was eliminated from the criminal code because we had it in the State pharmacy law. This spring the pharmacy law was completely revised, and a poison section was left out upon the representation that the code was to be revised and it would be taken care of there. There is one other State that has no pharmacy

law, but has a number of other laws bearing on pharmacy: Indiana. Mr. Sloane, of Indianapolis, kindly sent us the laws of Indiana bearing on the pharmacists, pertaining to the sale of poison and matter for immoral purposes. We find also that there is a large number of States that have followed the example set originally by Georgia, namely: that morphine must be put in bottles provided with a red label with white letters; that the morphine must be wrapped in scarlet paper. Mississippi and Ohio have adopted that law, and possibly some more States have. There is also a law in these States that arsenic shall not be sold in quantities less than one pound, that is, arsenic sold by the retail pharmacists must be mixed with either charcoal or indigo—the object of which is clear; it may be a very good idea. If arsenic is introduced surreptitiously in some kind of beverage, the presence of the indigo would show the presence of the arsenic.

There is another point that the law requires, renders mandatory, the registration of poison. Now some laws do not require registration, simply by inference. That is very important, and if you desire, I shall run over the tabulation of that. I will only enumerate those States in which registration is obligatory. It is obligatory in California, District of Columbia, Georgia, Iowa, Kansas, Minnesota, Mississippi, Missouri, North Carolina, North Dakota, Ohio, Pennsylvania, Oklahoma, South Carolina, South Dakota, Virginia, Washington and West Virginia. In some of these cases the list is divided into Class A and Class B. Class A are the most destructive poisons, like arsenic, and so on, and in some of these cases it is only Class A that is required to be registered.

We have also a tabulation with reference to the character of the poisons; giving an enumerated list, and some are not specially defined; also whether the law requires them to be labeled, and also the maximum and minimum penalty:

LIST OF STATES HAVING POISON LAWS, WITH THE MOST IMPORTANT PROVISIONS.

State or Territory.	Pharmacy or Separate Act. Specification.	Registration of Sale. Obligatory.	Registration of Sale. Optional.	Labeling. Poison.	Penalty. Minimum.	Penalty. Maximum.
Alabama	Sec. 8, Enumerated List	.....	Yes	Yes	$10 00	$100 00
Arkansas.	No Sec. or other Act.					
Arizona	No Sec. or other Act.					
California	Sec. 10, Schedule A, B	Yes, A	Yes, B	Yes	.....	50 00
Colorado.	No Sec.					
Connecticut.	Sec. 3130, Enumerated List	Yes	.....	Yes	1 00	100 00
Dist. Columbia.	Sec. 10, Schedule A, B	Yes, A	Yes, B	Yes	25 00	100 00
Delaware	Sec. 4, arsenic, strych., cor. sub.	Yes	.....	.....	5 00	
Florida	Sec. 8, Enumerated List.	Yes	.....	Yes	10 00	100 00
Georgia	Separate Act, Schedule A, B	Yes, A	.....	.....	.....	1000 00
Idaho.	County Boards.					
Illinois.	No Sec. or separate Act.					
Indiana	No Pharmacy or separate Act.					
Iowa	Sec. 9, Schedules A, B	Yes, A	Yes, B	Yes	25 00	100 00
Kansas.	Chap. 174, Sec. 4, Schedules A, B, C	Yes, A, B	.....	Yes	25 00	100 00
Kentucky	Secs. 9 & 10, Enumerated List.	Yes	.....	Yes	50 00	
Louisiana	Sec. 7	.....	.....	Yes	50 00	100 00
Maine	No Sec.					
Maryland, Balt.	No Sec.					
Massachusetts.	Chap. 209, Act 1888, Sec. 6, List	Yes	.....	Yes	.....	50 00
Michigan	No Sec.					
Minnesota.	Sec. 14, Enumerated List	Yes	.....	Yes	5 00	50 00
Mississippi.	No Sec., separate Act.	Yes	.....	Yes	.....	500 00
Missouri.	Sec. 4618, Schedule A, B	Yes, A	Yes, B	Yes	25 00	100 00
Montana	Sec. 15, Enumerated List	.....	Yes	Yes		
Nebraska.	No Sec.					
N. Hampshire.	No Sec.					
New Jersey.	Sec. 6, Enumerated List.	.....	Yes	Yes	10 00	
New Mexico	New Law, 1895; no returns.					
New York	Penal Code, Sec. 401	Yes	.....	Yes	.....	50 00
North Carolina	Sec. 9, Schedules A, B	Yes, A	Yes, B	Yes	25 00	
North Dakota.	Sec. 14, Schedules A, B	Yes	.....	Yes	5 00	
Oklahoma.	Sec. 19, Enumerated List	Yes	.....	Yes	25 00	100 00
Oregon	Sec. 10, "Poison."	Yes	.....	Yes	10 00	100 00
Ohio.	Separate Poison Law	Yes	.....	Yes	20 00	100 00
Pennsylvania.	Sec. 10, poison defined	Yes	.....	Yes	5 00	50 00
Rhode Island	Secs. 9 and 10, Schedule A	Yes, A	.....	Yes		
South Carolina.	Secs. 11 & 12, Enumerated List	Yes	.....	Yes		
South Dakota	Sec. 12, Schedules A, B	Yes, A	Yes, B	Yes	10 00	
Tennessee	No Section in Pharmacy Act.					
Texas.	No Sec.					
Utah	Sec. 15, Enumerated List	.....	Yes	Yes	.....	300 00
Vermont	New Law, 1895; no report.					
Virginia	Sec. 11, Schedules A, B	Yes, A	Yes, B	Yes		
Washington	Sec. 12, Enumerated List	Yes	.....	Yes		
West Virginia.	Sec. 9, Schedules A, B	Yes, A	Yes, B	Yes		
Wisconsin.	Sec. 14, Enumerated List	.....	Yes	Yes	5 00	
Wyoming	Sec. 12, Enumerated List	.....	Yes	Yes	10 00	

Supplementary Notes on Poison Laws.

Colorado.—Pharmacy Act, Chapter 13, confines the sale of poisons and all preparations of them, and proprietary medicines containing them, to registered pharmacists.

Connecticut.—Requires date of sale on label.

Florida.—Separate Act, 1886, requires morphine and preparations to have label in scarlet, with white letters, and to be wrapped in scarlet paper.

Georgia.—Separate Act, 1887, prohibits sale of opium and preparations upon protest of relative.

Illinois.—Criminal Code Section revised through passage of Pharmacy Act, 1895.

Iowa.—Chapter 83, Section 4, XXI., requires lye to be labeled poison.

Kansas.—Chapter 174, Section 4, abortifacients, except on prescriptions, prohibited; requires skull and cross-bones label.

Kentucky.—Label, human skull and cross-bones, dose for adult, and antidote.

Massachusetts.—Requires label in red, with black letters, and antidote.

Minnesota.—Penal Code, Section 326, 1891, requires labeling all medicines; penalty for wrongly labeling and refusal to exhibit record.

Mississippi.—Same provisions as Georgia. Morphine in scarlet wrapper; arsenic, in quantities less than one pound, mixed with soot or indigo, one ounce of soot or one-half ounce of indigo to one pound, not to be sold to minors; prohibits poisoning fish and other animals.

New Jersey.—Requires label printed in red.

New York.—Penal Code provides penalty for wrongly labelling or omitting label in red.

North Carolina.—Skull and cross-bones required on label.

North Dakota.—A poison defined as destructive to adult human life in dose of sixty grains.

Oklahoma,—Second conviction of offense, certificate revoked.

Ohio.—Morphine Law requires morphine to be labeled in red and white letters; arsenic, in quantities less than one pound, mixed with one ounce soot or one-half ounce indigo, Label Law requires poison label and at least two obtainable antidotes.

Upon motion the report was received and referred to the Committee on Publication.

MR. PRESCOTT: I desire to note the importance of this matter last reported upon, that of the registration of the sales of poisons by pharmacists. I think the Amer. Pharm. Association ought to give serious and continued attention to that matter. It is a matter of considerable difficulty I am aware, and embarrassment in many cases; but the difficulty and embarrassment ought to be overcome by prudent, sensible provisions of State laws, and all states ought to have laws to this end. I think the profession of pharmacy is in some disgrace in various communities of various states, by their failure to register the sale of poisons when cases of suicide by insane persons, and cases of attempted homicide occur, as they frequently do, in such communities; and it is for the interests of pharmacy especially, in its need of legal regulation, that the pharmacists of the country should look well to their duty in this regard.

MR. ALPERS: I should like to illustrate the correctness of the remarks of Professor Prescott, by an incident that happened just a few days before I came from home. A man came into a store at Paterson, New Jersey, with the intention of committing suicide; he had been on a spree for some time. I need not dwell on his previous life; anyway he was satisfied he wanted to commit suicide. He walked in and told the clerk to give him some poison, saying, "I want to commit suicide." A friend of his followed him and interfered, and told the clerk at once what this man intended, and that the

man was not fit to make this purchase; and he was refused. In New Jersey I might say no compulsory registration of poison sales is in existence, much to my regret. I tried to get it enacted, but without success. The same man went into another store with the same result; he went to still another store, and a young man there, who was impressed with the importance of his position, replied to this friend of the would-be suicide, who had followed into the store, that it was none of his business, and not to interfere with his sales; if he wished to sell the man poison it was his business to do so, and he was going to do it. Accordingly, he sold him fifty morphine pills; this man took the fifty pills, and was dead the next morning. This is not a story, but a fact. It created quite a sensation, of course. There is some intention of bringing this up before the grand jury, and as soon as I heard of it I intended that the Board of Pharmacy, of which I am a member, should move in the matter, because I felt greatly the disgrace which pharmacy had been brought into by this young man. The young man, by the way, was not a registered pharmacist, but was an apprentice, or was called a general clerk. I at once communicated with the other members of the Board, and asked that some decided steps should be taken in this matter. Since then I have not heard what has been done, having left for Denver. I would state, however, that the owner of the store where this happened, afterwards said to a reporter that the sale was all right; that this other man was not there at all, or could not be understood—those people were Germans; and he tried to make out the non-existence of this man who came there to warn the clerk, and that besides the poison had been sold under the supervision of a registered pharmacist, as the law requires should be done. If there had been compulsory registration, this trying to lie out of it would never have happened, because the record would have shown at once who made the sale; and it would be greatly to the benefit of pharmacy in general, if compulsory registration had existed in New Jersey.

MR. REMINGTON: I am very glad that Prof. Prescott has especially called attention to this subject, and I hope that a committee will be appointed with Prof. Prescott as chairman, to draft a resolution as the sense of this Section. I think that it will come in just at this time very properly. We have had a stir in Philadelphia only two weeks ago on this subject. A prominent newspaper took the matter up and sent a reporter round to the different drug stores in Philadelphia, quite a number of them, to see how easily he could get poisons from drug stores. As the Secretary has stated, we have a law in Pennsylvania requiring registration, but it was found that it has not been enforced as it should be; and after the newspapers had given the druggist a severe castigation, they upon the next day published a statement saying that the druggists were not so much to blame as those who had the enforcement of the law in charge; that they should have seen that the law was enforced. Of course we all know that it is a very difficult thing to put upon the pharmacists the duty of ascertaining when a customer comes in whether the particular poison is to be used for suicidal intent, or what it is to be used for. I know very well that most pharmacists can use such discretion as every honest pharmacist ought to use in the matter, and believe that a great many suicides could be averted by the exercise of that judgment and tact that is absolutely required; but in view of the fact that many of the States have not this registration requirement, I believe that this registration would save many lives. I think some resolution recommending to the Boards of Pharmacy of the various States that they enact laws requiring registration, would certainly be a helpful one in that direction.

MR. ALEXANDER: I hope that committee will be appointed, because the sale of poisons appears to be very different in every State. Now there are States which have no Board of Pharmacy. Will it not be well to suggest to this committee, which Mr. Remington proposes to have appointed, to draw a general law for the sale of poisons and recommend it to each State for adoption? We have had just the same experience

in St. Louis as Prof. Remington has had. A reporter went around and called for different poisons. One of the first men he saw was M. W. Alexander. He came in. Alexander himself sold the preparation. He came in and asked me for an ounce of Fowler's Solution. I complied with one of the requirements of the State law, which was to ask what he wanted to use it for. He said he wanted to use it as a preparation for the purification of his blood. I asked him if he knew how to use it; he said he knew all about it. I then sold him an ounce of Fowler's Solution, took his name, residence, and what it was to be used for, and put it all in my registration book. That is the law of the State of Missouri, that in the sale of poisons the druggist has the discretionary power to make inquiry as to what it is to be used for, and label the poison. Next day a report came out in the paper stating that poisons were run wide open in the city of St. Louis; that he had been in one store and asked for an ounce of arsenic, that he got it, and that it was not even labeled. At another store he got some strychnine, and that the druggist never inquired anything about it. Of course, that is against the law. Then came out a publication which I had never heard of before; it was the city ordinance defining the sale of poisons, without giving any names of the poisons whatever, but that no poison should be sold except on physician's prescription. Now then, that is a very indefinite thing, and I don't believe that a city ordinance can put aside a State law. But this is the position we are in. Now, I think we ought to have uniformity all through the country as to poisons, and how they are to be sold.

Dr. Whelpley: I am sorry that more pharmacists are not present to be impressed with the necessity of recording the sale of this class of goods. We have in the United States many of these laws requiring the registration of the sales. The statistics gathered a few years ago showed they were quite generally disregarded. So that while we are in the right in presenting this resolution regarding the law, we should have at the same time, as far as possible, impressed upon our fellow pharmacists the necessity of complying with it. We have an instance of complying with the law in one of the large cities of Missouri, where a customer bought strychnine to kill rats. His wife died soon afterwards, but so carefully had he covered up the crime that for nearly a year not a clue was found. But about that time some detective on the case discovered that this man called at a certain drug store about the date or the morning of the day of the murder, and sure enough here was recorded the sale, and from this clue resulted the conviction of the murderer.

Mr. Prescott: If it should be the pleasure of the Section to appoint a committee for that specific duty, I would not oppose it. I would observe, however, that the officers of this Section have the matter of collecting the statistics of State laws now in hand, and we want them to continue it, and I think the whole thing had better be left in the hands of the officers. This discussion must be made known, of course, through our records and other reports, and I am very glad that it will go to emphasize Professor Remington's own remarks, or to emphasize the importance of this subject. It hardly seems to me, however, that a committee is necessary.

Upon motion to appoint the Committee, Messrs. Prescott, Remington and Alexander were thereupon appointed by the Chair to serve as such Committee.

The nominations for Officers of this Section being then in order, the names of Prof. Hallberg and Prof. Beal were placed in nomination for Chairman.

For Secretary, Prof. Hurty was placed in nomination. Prof. Hurty

thanked the section, but declined on the ground of his inaptitude for such a position. Prof. Bartley was then placed in nomination.

A paper was then read by Mr. Sheppard, entitled "Requirements for Graduation," which is as follows:

REQUIREMENTS FOR GRADUATION.

BY S. A. D. SHEPPARD.

So much has been written on this subject that I would first of all apologize for saying anything about it; secondly, I would state exactly where I stand—my position is that the degree of Graduate in Pharmacy should be given only to those who have had at least three years' store experience, exclusive of the time at college.

A change in methods of pharmaceutical education is now going on, Schools of Pharmacy have grown more numerous, the curriculum is more thorough and more extended. Students are many and more earnest in work than ever before. These changes are in the line of progress and we are glad of them. But we now come to a new factor that has entered into the problem of the technical education of the pharmacist, one that formerly had no place in it whatever, a factor of great importance in its own place, and for that very reason we should be careful not to get it out of its own place. This factor is the Board of Pharmacy. Pharmacy laws have now become almost universal throughout the States of the Union, and are doing splendid work in educating the people, the great public at large, to the fact that the pharmacist should be something more than a merchant. They are also improving the general character of the profession by requiring all who would practice Pharmacy to pass a reasonably severe examination. But the Board of Pharmacy has no connection with the teaching college, and cannot act for it, or even appear to be its agent in the most indirect way—this would be suicidal. They are separate, and ought to be separate. Nevertheless, some of the most prominent educators in our country are leaning strongly toward a new departure, in fact we may say that they are already intrenched there—namely this, that the Boards of Pharmacy alone should take note of the practical store experience, thus allowing the teaching college to drop that phase of its work. Every one without exception admits that store experience is an absolute necessity in the training of the pharmacist. This is one of the points which is so self-evident there can be no difference of opinion about it. Now, has not the teaching college as good an opportunity to learn what practical store experience its student has acquired, and how much that experience is worth, as has the Board of Pharmacy? I claim that it has just as good and even a better opportunity to determine this fact than has the Board, and right here is one of the points I wish to make in this paper. While the teaching college has the opportunity to do this, I do not think that as a rule it has in the past improved its opportunity, and I think that this is a phase of

the work of the teaching college to which it should give far more attention than it has ; in other words, that what may be called the trustees examination should be as rigid in testing the proficiency of the student as a practical pharmacist as is the examination conducted by the Board of Pharmacy. If this were so we should hear very few of such statements as we now do in regard to graduates failing when they come before the Board. It would also be a heavy blow at the best point of the argument on the other side, viz., that colleges know very little as to the practical experience their students have had.

Can the student do as good work in college before he has any store experience as after? And will not his store experience be a decided benefit to him in giving him a more clear and perfect understanding of the facts brought to his attention by the professors in the college? Here is the real question to be answered. This is one of the disputed points in the controversy now going on, and it would seem that there is a certain amount of prejudice on both sides, though many are honestly striving for a correct answer to the query. Let all of us who are specially interested in this problem strive when we are discussing it to divest ourselves of the prejudice which the force of long years of habit has given us, and also the prejudice engendered by the desire for large financial returns in college work, and let us strive to look at the question from the students' standpoint, which is the only right one here. Perhaps I may be as prejudiced as is the most positive person on the other side, but I can truly say that I have striven earnestly during the last two years to look at this subject from the students' standpoint only, and I am more and more settled in my conviction that the student *can* get more real benefit from his course in college *after* he has had a considerable store experience than he possibly can without it ; and the thought has been emphasized with me by the fact that during this period I have had in my employ one who took his college work before going into a store.

There is another way to look at this question, which is not at all new, but which is so important that it deserves to be considered most carefully and emphasized at every turn : it is this—the degree of Graduate in Pharmacy has always represented a course of college training *plus* store experience ; now I claim that this degree is old enough and good enough to have acquired a lasting place in the history of Pharmacy. Leave this particular degree untouched, let it stand just as it has stood, representing just what it has represented for these many years past. If there is to be a general new departure, and education by the college irrespective of store experience, do as the University of Michigan has always done, give a special degree therefor, Ph. C. or such other title as shall be deemed best, but do not disturb the ancient landmarks which the Fathers have set up. Custom, long usage alone has some rights ; the many hundreds of men who hold these degrees have rights, and their diplomas should not be converted into waste paper.

The work which Colleges of Pharmacy have been doing the last forty years is good work, it has been tested, time has shown its value, and one of its main branches cannot be lopped off hastily without danger of doing great damage. Supposing for the sake of the argument that every one of the points made by the men on the other side is good, yet still there remains this long-established usage, the many good schools that are sure to follow out the old plan; and the question at once comes up, under any circumstances, why not leave this particular degree of Graduate of Pharmacy untouched? The fact that the movement for a pharmaceutical training irrespective of store experience has gained such headway, is an evidence that there is value in the idea. But that fact should not antagonize in any way the present good work of our colleges. If it must come, let it be an addition to the long-established scheme, not a substitute for it.

Upon motion the paper was received and referred to the Publication Committee.

Prof. Oldberg, in the absence of the author, then read a paper by Prof. Nagelvoort, entitled "The Better Education of Pharmacists," which is as follows:

BETTER EDUCATION IN PHARMACY.

BY J. B. NAGELVOORT.

I know that the best physicians in our country are working for co-operation from better educated pharmacists. Let us see to it that we do our best to respond to their expectation, rather than to be lured away from our calling by the siren songs of trade interests.

Pharmacy is no longer running in the old channels. As a mere trade it is a failure, and rightly so.

I will not silently submit to the subaltern position which pseudo-pharmaceutical journals advocate for pharmacy. Only a self-satisfied, shallow judgment can disapprove of scientific training, or object to the inculcation of scientific thinking, first and foremost.

Perhaps twenty-five years hence we may confidently expect the apothecary to inspire his apprentices or pupils with the ambition to do skillful, conscientious work; but we cannot look for the best inspiration for the practice of pharmacy in its broadest sense, among the paraphernalia of the present drug-stores with their patent medicine traffic.

I plead for better education and a good laboratory training for our coming generation of pharmacists. Our young colleagues, after graduation, will not be debarred from the opportunity to practice their art, as some have predicted. They will be welcomed by the older druggist, who knows his own interest as well as that of his profession.

If I had a drug-store, I would not have a clerk who could not apply the tests of the United States Pharmacopœia to my stock of medicines; I would have one who is prepared to assume all the responsibility for all the

technical work he does; I would, myself, supply the practical experience. The lack of that experience is a want which daily diminishes.

Will the American Pharmaceutical Association shut its eyes to the dawn of better days for pharmacy?

There is a deep under-current only here and there stirring the surface, which will elevate the rising generation from the dead level of mediocrity. It will work the liberation of pharmacy from the contagion of the patent-medicine mongers, and education alone can give to the pharmacist his proper rank among the scientific workers in the field of modern progress.

No surgeon or physician is now able to respond to the increasing demands upon his time and knowledge. He needs the co-operation of the specially trained pharmacist. The good common sense of our American people will demand better educated men in our profession, and will not fail to draw the line between the uneducated vender of drugs, and the well-trained pharmaceutical chemist.

Let us have pharmacy as the best men in our profession understand that word—the pharmacy to which the lamented Scheele, Mohr, Wittstein, Trömmsdorff, Hanbury, Flückiger, Procter, Maisch, Trott and Parsons, unweariedly, unceasingly devoted their lives. Drug-store apprentice accomplishment is of secondary value.

SECRETARY HALLBERG: I desire to take exception to a statement in the paper about pharmacy, as a trade, being a failure; that is, the old English definition of trade. I think if that is what is meant, the statement is wrong. If it is intended in a pure business sense I have no doubt it is correct; but if we regard the drug trade as similar to that of the artisan and mechanic, involving manipulations of skill and experience, then I think the statement is wrong and ought to be qualified.

MR. OLDBERG: As I am familiar with Prof. Nagelvoort's views on this point, I think I can explain what he means. He means that the commercial trade of the druggist is a failure. He means that efforts to establish trade rules and combinations, for instance, to prevent the cutting of prices, and such matters as that, will never mend the ills for which we suffer.

MR. PRESCOTT: I have listened with a great deal of interest to the paper of Mr. Sheppard, and I may be permitted, perhaps, to add a word which it seems to me may do something toward a completion of a settlement of the whole proposition respecting it. On the one hand, apprenticeship before college; on the other hand, the college before the apprenticeship. It will be observed that Mr. Sheppard claims, with some emphasis, that the college student who has had apprenticeship is at an advantage over one who has not had apprenticeship. And it will be observed that he leaves the statement regarding those two relations right there. I will not contest that statement of Mr. Sheppard. I have been inclined to make it myself. I think that the student with the apprenticeship has some advantage in the school. It is not always favorable. The results seem sometimes to be the other way. It is not uniform. About half the students in our school have had apprenticeship and half have not, as a rule. They are in the same work and under recitation and class every day during both years. In those cases, of which there are a good number, where the students have had apprenticeship, their high school work has been interrupted. They have not that discipline of study which

the other students, who have come directly from the high schools, possess. At the same time I should hardly be willing to object to a conclusion—I am not quite sure of it—that on the whole, on the average, those students who have had apprenticeship are in a somewhat more advantageous position than those who have not. I am not quite sure of that, but I should not object to it very strongly. I wish now to call attention to the converse of this question. I do not speak from my own experience. I speak from the experience of the majority of the six or seven hundred graduates of our school as to the advantage of the college course before apprenticeship; and they all say, men who have been out in practice one or two or ten or fifteen or twenty years, all tell us that a year of apprenticeship after the college course is worth more than two years, they generally say more than three years, of beginning experience without previous college course. I do not know whether any of them are here present. But I would like to have you ask any one of them on that question. I might in this connection remark as to the experience of our school. I might perhaps cite it without violation of modesty, because it is one of the oldest, probably the oldest school which undertook to give the college course without requiring apprenticeship before it—taking men from the high school who have never done any work in a drug store to the extent of half the number, or two-thirds, or one-third, or whatever it may be. I call your attention to this; you can look over our alumni list; the majority of these men are in dispensing pharmacies at the present time. Good numbers of them are in manufacturing pharmacies. Sometimes they yield up dispensing pharmacies and go into manufacturing pharmacies. Sometimes they leave manufacturing pharmacies and get to be proprietors in dispensing pharmacies, of whom Mr. Snow, of Omaha, is one. A very large majority of them are in pharmacy and related chemistry. Manufacturing pharmacy I count to be a branch of pharmacy. I object in toto to ruling out manufacturing pharmacy from the educational requirements of pharmacy. All our responsible men in manufacturing establishments ought to be trained in everything that a dispensing pharmacy wants; everything, especially, in an operative pharmacy. It is too bad that they are not. I count them in pharmacy. Analytical chemistry, as has been stated, I do not count in the pharmacy, but it must be granted that the services of the analytical chemist cover a great deal of the qualifications of a thoroughbred pharmacist. The literature of pharmacy shows that it carries with it a great part of the literature of analytical chemistry.

Mrs. Miner: I wish to speak a moment from the standpoint of the retail pharmacist. My experience for ten years in employing clerks has been that those who have received a practical experience in a retail drug store for one to two years before attending a college or school of pharmacy, then attending a school for a year and another year in the store, or the summer, the interim between at least, and then to complete their collegiate course, and come back to the retail business, have been to me the most satisfactory employés by far.

Dr. Simon: I have always taken good care not to put my name on a diploma of the Maryland College of Pharmacy without being convinced that the man was fully capable of attending to the duties of a pharmacist. Yet for years past I have done so reluctantly, for the reason that there are statements in the diploma over which we have no control whatever, of which we know nothing, and that is the practical store experience. I think that there will not be a single representative of a college who will claim that he does not find plenty of men among those admitted to the college whose store experience amounted to very little indeed. Yet these men may have made very excellent students afterwards. Now it is the duty of the college to teach both the art and science of pharmacy, and the colleges do it, so far as it relates to filling prescriptions with the proper articles, etc. Every graduate should have this knowledge, and if the student comes to us from a store and cannot fill the more difficult prescriptions, it is our task to teach him. What I ob-

ject to is to certifying in our diploma to a practical store experience, because it does not mean simply to fill prescriptions, but it means a great deal more, somewhat pertaining to the commercial side of the question. It pertains as to how to meet a customer, and perhaps how to put up a neat package, and all those details. As colleges of pharmacy we should not place ourselves on record as testifying to anything over which we have no control, and that is the position which I occupy in this matter, and for which reason I cannot altogether agree with my friend, Mr. Sheppard.

Mr. Beal: I only wish to raise the question whether or not this is not a consumption of time in discussing something which will have to be discussed a great deal at a later period in the day, and to inquire whether it would not be wise to postpone the discussion and take it up all together, instead of spreading over so much time.

The Chairman: I really had in mind the utilization of time, looking towards the members to free their minds on this subject.

Secretary Hallberg: I would like to ask Dr. Simon a question. Dr. Simon objects to signing a diploma, which makes the statement as to the qualification of a man practically, such, for example, as being able to put up a nice neat package. Is he still willing to let the fact go out through the sections of the country that a man who receives a pharmaceutical diploma is not capable of doing up a fairly agreeable package in a store? Does he desire to have it go out that a graduate of the Maryland College of Pharmacy cannot, when he goes out in the world looking for a situation, be placed behind the counter and do the very commonest kind of work, the first work that is required of an apprentice?

Dr. Simon: I might say in reference to that, that the minor details are of course taught in the practical pharmacy. A man who has been in a store might have a little more experience in that way, but he can be taught in a pharmaceutical laboratory the same thing in a very few hours.

Mr. Alpers: It is very doubtful in my mind whether any harmony on this question can be reached. It has been argued for a number of years, and we have not advanced materially, although those who advocate college education before practical experience, claim that they have made considerable headway during the last five years. I personally of course, not being a teacher in a college, am not speaking of the experience of a college teacher. I personally believe, always have believed, and believe now, that it is more advisable for a young man to take a practical course in a store before he finishes his college education. I say it is perhaps more advisable. I cannot say that I would make it obligatory for him. That is his business to consider. I cannot imagine that instruction in pharmacy, in materia medica, in pharmaceutical chemistry, can be as successful and useful to a man who comes without any knowledge of the inside of the pharmacy as to the one who has served an apprenticeship. Nor do I believe that the young man who leaves a college with a degree attached to his name, and has never seen the inside of a pharmacy, will be as efficient as the one who has served a good apprenticeship. It is of course true, very true, that he lacks experience; that he can soon gather his experience; that in a number of years he will be equal to the other man. The question is, Will any college graduate submit to all the humiliation, to all the small and unpleasant work that is absolutely necessary to learn, and which every man has to submit to? I, as a practical pharmacist, know that I personally have many days and many weeks performed and do perform in my pharmacy work that I dislike. It is the kind of work to which we are forced. We must do it; it has to be done: cleaning of bottles, washing windows and sweeping the floor—all such little things which by right do not belong to any man of education; that should be left to a porter or some boy hired for

that purpose, and has yet to be done by an educated man, because the average pharmacy of to-day is not such a financial institution that a man can be hired for every branch of work. The various branches of our work are heaped on one shoulder, and they have to be attended to. It is very difficult to imagine, at least it is to me, that I should ask a young man who comes to me, that is twenty-one years old, and wants a position as apprentice, to do this kind of work, because that is all to be expected of him, that he wash the bottles, the windows, sweep the store every morning. You may say these are ridiculous details, and such menial work that ought not to be spoken of. But I claim that they do play a part. It is a very essential feature that the pharmacist's attention be called to these things, and while I have pointed out only one or two things, there are quite a few things that the practical pharmacist knows, and that the college professor has no idea of. I therefore advocate practical experience before college pharmacy. I say it is advisable for the reasons I stated, but I would not like to go as far as Mr. Sheppard did in his paper, and say it must be done. If I ask a man to have a practical experience before going to school, I do so because I believe it would be in his interests. But I do not wish to be understood as saying that I claim that every one should take the same position. The school is there for the teaching and spreading of knowledge, and if a number of teachers wish to spread this knowledge to instruct young men, I do not see why they should be compelled to examine the intelligence of their student except so far as that they are satisfied that he is sufficiently educated to understand the lectures. If the college wishes to graduate men who have no practical education, I do not see why they should not do it. There is just as much work for them to take any one who wishes to learn as there is for any other school in any other branch they take. A young man comes to them and says: "I want to learn what you teach." "You are welcome, we will teach you." It is none of our business what use you make of your knowledge afterwards. We have nothing to do with that. And I say, that the degree of Graduate of Pharmacy, or whatever degree may be conferred, in itself should not be a guarantee of practical experience. I do not see why the school should bother with it. Do other schools do it? Is the degree of doctor of medicine a guarantee that the man who has it is a successful or skilled practitioner? Not at all. It simply certifies that he has learned certain things. Is the fact that a man leaves a school of law with a certain degree any assurance that the man is a skilled lawyer? Not at all. It simply certifies that he has gone through a certain course and has been taught certain things. And practical experience he can gather where he pleases. They do not care. So in every other branch. Take philosophy: If a man wishes to take philosophy to fit himself for the position of a teacher, it is simply an acknowledgment of attendance in his school, and the passing of certain examinations. It is not an assurance to any board of education that that man has had practical experience. That is the rule. There may be exceptions to this. A school as such is only there to impart knowledge, and I cannot understand why any one should be excluded from the benefits of getting this knowledge simply because he has not lived before in such a way as a certain man wished him to live. I can't understand why it should be. I wish also to call attention to Mr. Sheppard's paper, particularly to one inconsistency that he brings in. He asks us in the beginning to put aside all prejudice that long custom and usage may have caused in us, and afterwards he pleads as a most important fact why the meaning of the title of Graduate of Pharmacy should not be changed, because it is usual or it has been by custom used in a certain direction. So that while he asks us to put aside prejudice, old custom, he uses this very fact of long standing as the main argument for his side of the question. There is certainly an inconsistency there. If he wants to put aside a prejudice, he also must put aside the prejudice of the meaning of the word Graduate of Pharmacy, what it means, because we are just now trying to establish what it does mean, and the fact what it has meant before should therefore not influence us.

MR. SHEPPARD: I would like to answer Mr. Alpers on one point, in regard to the inconsistency of my paper. I think Mr. Alpers has misunderstood me. The two questions are entirely distinct and separate. That in respect to the matter of prejudice; it was in regard to the question of before and after store experience, as to whether the college training should come before or after. That was the point I made there. The other part of the paper was entirely distinct and separate, namely, a plea for the keeping of that degree just as it always has been. If we have a new department, let us have a new title. The old degree always represented two things, namely, schooling and practice. Let it still represent two things, schooling and practice. That was one of the main thoughts I had in writing that paper. It seems to me that the work of the past and the future of pharmacy has been so good, and that title of Graduate in Pharmacy practically represents the work of the fathers that are now dead—Procter and Parrish, we might mention—that is, it is good enough to have a prominent place in pharmacy education. I may be somewhat sentimental in the estimation of the value of that degree. I know from the hundreds of men throughout the United States who hold that degree and value it highly, and it has always represented just those two things, and I hope we shall let it always represent those two things. There is plenty of room for another degree, if we choose to have it; but I do not think there is any inconsistency in my paper in pleading for that on the one hand as a matter of long custom and usage, and on the other, pleading for unprejudiced judgment on the matter of whether the college education should come before or after store experience.

MR. REMINGTON: Mr. Chairman, I don't propose to make any argument on this subject. I think my position is very well understood, but I would like to ask Dr. Simon if the only objection to the apprenticeship requirement is the one that he mentions in connection with having it on the diploma, because if that is the only objection it is very easily left out. That settles that question.

DR. SIMON: In regard to this I will say that it is my main objection to our certifying on the diploma. I am not at all opposed to the experience; in fact I think it is a good thing; but I am opposed to certifying on the diploma to the fact, and I heartily agree with Mr. Sheppard that it might be well to leave the degree of Graduate in Pharmacy to the combined necessities of store experience and college experience. But for my own part, I would recommend to the school I represent to drop the title of "Graduate in Pharmacy," because, as I stated before, I very relucantly put my signature to anything over which I have no control, and of which I have no positive knowledge.

MR. REMINGTON: I only want to say that I don't think, from Dr. Simon's remarks, his position was understood. I am perfectly satisfied with Dr. Simon's answer, and I am prepared to endorse his position, so far as that is concerned. To be sure the diplomas of all the colleges of pharmacy, I speak now of them as colleges of pharmacy, simply testify to the fact that the applicant has had a certain experience in the drug and apothecary business. That is all. It does not testify at all to the character of that business, whether it has been good, bad or indifferent—and that is the question, and Dr. Simon is conscientious about that; he does not want to attach his signature to a diploma which certifies that the man has been in the drug business at all, as I understand; but I think that is the wording of nearly all his diplomas, simply that the man has been in the drug business for a certain time.

MR. CASPARI: It has been stated that college professors are not in a position to argue the matter properly, because they have had no experience in the drug stores themselves. I beg to take exception to that, for I have had some experience in a drug store. I served twenty-six years behind the counter. I hold the degree of Graduate in Pharmacy, and I am also a teacher, so I claim that probably I can speak on this subject in a disinterested

manner. It has been stated that the experience before college attendance should be made a necessary requisite for the degree of Graduate in Pharmacy. Friend Sheppard holds very firmly to that. That was all good in the days when store experience was true pharmaceutical experience, but this has entirely passed away during the past five or ten years, and all those who are familiar with the drug business of to-day must admit that an apprenticeship of four years in the average drug store of to-day counts for almost nothing. Four years' experience in the drug store of to-day cannot compare with six months' work in the laboratory of a well-conducted school of pharmacy. The better schools of pharmacy cannot afford to make their instruction any the less effective in that respect. They must each operate a dispensing pharmacy, and, if necessary, they can also teach students how to wash bottles, mortars and graduates. Our school, and of course I can only speak from my experience in that school, teaches the students to wash bottles, to clean mortars, just the same as in the store, because we know they are not taught such things in the stores to-day. I think if the experience gained in the drug-stores of to-day was at all in keeping with the teaching given in the pharmacy schools, there would be a unity of voice in all the colleges as to such requisites for graduation; but times have changed, and I am confident that if the fathers of pharmacy, as they have been called here to-day, could return to us and see the condition of affairs, look into the schools of pharmacy and the practical teaching there given, they would with one voice say that the school of pharmacy of to-day is the place where the young men learn the practical details of the business, and not in the stores. As the stores do not give it the colleges have been compelled to give it, and therefore we do not think that we should be held down by such requirements as four years' service, or presence in a drug store, because that is all it amounts to; or that the very uncertain experience, if it may be termed so, should be made a requisite for a degree. The college of pharmacy to which I have the honor to belong will take that view of it, I think, very decidedly.

Mr. Sayre: I second the remarks just made by the speaker, and at the same time also emphasize the remarks made by Prof. Beal, that it does seem almost useless to prolong this discussion. I think that, however, we might have an opportunity to state our positions without enforcing any agreement, except to enforce an agreement among ourselves, and not in any particular direction. I wish to state my position as Dean of the School of Pharmacy of the University with which I am connected. Most of you know that I have the degree of Ph. G.; this degree was taken at the Philadelphia College. Last year I was told that this degree had been abandoned, and it would be necessary for me as a representative of the college to decide whether I was ready to follow it or whether I was going to adopt something else. Therefore, it was necessary for me to bring the question up. The question was discussed, and these are the points brought out. We have had the experience of the ten years that I have been connected with the University; about fifty to sixty per cent. of students have had experience in the drug business. Those of whom I speak have had at least two years' experience. The others have had from two years down to nothing, some only about three months. Now the difficulty has been to bring a kind of uniformity of principle, and I would like to have time to recite to you the difficulties we have had. We would have statements made over the signatures of pharmacists that these men had been with them three months, some two months, five or six months, and adding together making two years. When we came to really consider the value of this, we had to say that it was practically valueless, because in many cases the drug-stores were doing no drug business at all. Now when the matter was brought up before the University, it was decided that this was a disgrace to our University, to put our voucher upon this, and call this experience. And yet we had been made to certify that this was practical experience; we were obliged to take their affidavit and we had to recognize it. Now we had to come to some determination in regard to this matter, and we thought under the circumstances it was best for us to drop this,

and not vouch for the experience any longer, but transfer this to the State Board. In doing this we didn't state or insinuate in any way that practical experience is not valuable. We require it, that is, before the person is a licensed or registered pharmacist. We insist upon that, but we simply ask the State Board to take charge of this matter. Before we acted upon this decidedly, we waited upon the State Board and asked them if they would not take this responsibility from us; that we did not wish to vouch for anything but what we did ourselves; and when the student has passed a practical as well as a theoretical examination in the University, we give him a diploma, and that means the work of the University; that is all.

MR. MAYO: The only point I want to speak of is this: It seems to me that this discussion has been carried on from the point of view of instructors. I think there is a commercial aspect to the question. I think the pharmacist who wants to employ a young man has come to attach a certain value to the words *graduate of pharmacy*. They have a good idea on the average of what it means. It means a good deal more than pharmaceutical chemist as regards practical work. While we understand that the two degrees are entirely separate and distinct, and although the degree *pharmaceutical chemist* carries with it a great deal more than *graduate in pharmacy*, it does not carry what the degree *graduate in pharmacy* does. I think that the view taken by Mr. Sheppard is that taken by the practical pharmacists all over the country. They want some sort of experience, even if it be some poor experience—even if they know how to wash bottles. The discussion it seems to me has been upon the point of view of individual colleges, as regards their particular requirements; and I have failed to hear a single teacher who has not told something about his own particular college and their particular course. The point I mean is this, that the body of pharmacists, whom we are supposed to represent, have not been mentioned at all, or considered in the matter as they ought to be.

MR. HURTY: It does seem to me that, and I have recently thought of advocating experience before entrance to the college, that pharmacy is occupying a position at the tail end of the general proposition of education. We do not in any college pretend to make a pharmacist. Who makes the pharmacist? What college in this land made one? He must make a pharmacist of himself. What college or what institution of learning can make a man? No institution of learning can make a man. Nor does a diploma say that he is a man because he has come from Harvard, Yale, or any other university. He is a man made so by himself. Imagine requiring experience in the pulpit of a preacher before he is allowed to enter a school of theology! I don't want him to work on me without knowledge. I want him to look the field over and understand it. They do not require experience in mines before a man is admitted to a school of mining engineering. They do not require experience in electrical works before they admit a man to a school of electrical engineering. Of course not. That is what he has gone there to learn. That is why he goes to the college of pharmacy. We do not make pharmacists, nor has any college ever made one. They cannot; they can only certify that he has had certain subjects presented to him, and that he has gained a certain percentage of proficiency in these colleges, and that is all that can be said. The declaration of the lady member (Mrs. Miner), that in her experience of ten or twelve years of those she had employed and had given the best satisfaction, were those that were graduates who had experience before graduation, met with great favor. Granted that is all true—I know it is true, for she has said it—it proves nothing; for I stand here to say that I have also been in the retail business for over over fifteen years, and the best man I have to-day, the best informed pharmacist, has never seen the inside of a college of pharmacy. He came to me, however, as a graduate of a university. He had taken the literary course. and had paid some particular attention to chemistry; and that man is so superior to all the others in my

establishment there is no use discussing this question at all. He has no degree whatever, but he has an understanding of all these remedies which we have to handle from his higher education in chemistry, as sulphonal, and the whole list; he has an understanding of their chemistry, that I doubt whether there are any pharmaceutical graduates that have his knowledge, because their training has not been carried on that far. He has had four solid years in chemistry, and a fifth year afterwards, and still he has taken up pharmacy. Mr. Alpers remarked that a man who was so highly educated did not like to take hold of the menial work. This man will do the menial work without any trouble; he does it without any hesitancy; he will mop up the worst mess that can be made anywhere.

MR. HALLBERG: I would like to ask the gentleman if he conducts an ordinary drug store. You sell patent medicines?

MR. HURTY: No, sir.

MR. HALLBERG: Isn't the most of this man's work in the laboratory?

MR. HURTY: No, sir, he puts up prescriptions; and when he takes the Pharmacopœia, and reads over the list, just one reading, and it is his.

MR. ALPERS: Is he registered?

MR. HURTY; We have no registration law. It is free for all there; the best wins. No man is helped by any law, or injured either. I might mention my own experience. I am not a practical pharmacist; I don't like the word practical, because I do not know what the gentleman means when he uses it. What is theoretically perfect is also practically perfect. If this word practical is used it seems to me to indicate experience, to indicate actual work, right at the counter. Now, another point: if our colleges start at the bottom and commence to teach pharmacy, just as if the student had never seen the interior of a drug store—and that is what you do, you commence to teach weights and measures, etc.; I have heard Mr. Remington upon the subject—why do colleges do that, if you are going to allow so much stress to be laid on the experience? I do not understand why they should do it. Why don't they take a start at the point where the other fellows left off? Why make him go over the same thing after he has had four years' experience. They can take and teach him from the beginning. I am very sure in my mind that we will come to the time when the University will have to go on in this way: they will go on extending the time. They are doing it all the time, and they will go on extending the privilege for entrance, and I do not believe that any resolution of this Society can govern the great state universities which are not in business for revenue at all, but exclusively for education, and do not depend on their support at all by patronage. They will go on in this line.

DR. WHELPLEY: I do not wish to consume much time, because I do not suppose that I could convert any teacher in a college of pharmacy from his previously-conceived plans or notions. Nor have I much to say about my college, with the emphasis on the "my." Nor have I any particular young man to mention. I would like to say this in a personal way: that if the gentleman from Indiana is not very careful, that jewel of a clerk that he has will have many positions offered him within a week's time.

MR. HURTY: That is what I am afraid of.

MR. ALPERS: That man could not take a position in any other State, because he is not registered.

DR. WHELPLEY: I would like to state from my standpoint what I consider to be an

inaccuracy: First, that by requiring practical experience of a student before attendance at college or before his graduation, we are placing him in the pulpit to preach before he has learned how. That is not it. What is the objection to our certifying to practical experience? When we are unable to certify to the entire character of it is only a comparative objection. In other words, that is true in all the departments in which we examine the student. Who is thoroughly satisfied that he has found out just how proficient a student is until he has examined him, not only in practical experience but in other branches? So that rather than throw this overboard, we had better endeavor to improve our methods and departments by the character of practical experience; and by the way, the laws of several States are assisting us to that end, and doing good work by superintending or keeping count and specifying the conditions under which an apprenticeship shall be served. Illinois is one of the foremost in that line; so that here we are starting out in the direction of better controlling practical experience, and another class of teachers are throwing overboard the practical experience at the very time when they should remain and take advantage of the progress made in that direction. Many arguments have been advanced, but there is one that I have not seen mentioned which I believe is a valid one as far as it goes, one that we should carefully consider. Every profession, every trade, every occupation, is overcrowded. We find people giving up the occupation that they have prepared themselves for. Now, I feel that whenever a young man adopts a course in a college of pharmacy without any knowledge of the drug business, he cannot determine until he has spent his money, his time in the college, and then entered the drug store, whether he is a fit man to be a pharmacist or not. On the other hand, I have for years felt that pharmacy was an occupation where a young man could enter a drug store, then when he is seriously disappointed when he finds out that all that glitters is not gold, and there is something to do besides waiting on the young lady customers, if he is agreeable to the conditions of pharmacy he continues and makes a worthy pharmacist; if not, he seeks some other occupation; and I feel that it is a duty of the college of pharmacy to better the condition of pharmacy by giving the apprentice every opportunity of understanding just what he is coming to before he has gone so far that he will not give it up.

One of the speakers stated that his college would not lower the standard of Ph. G. by graduating students with that title after having completed only a portion of the requirements of our own established institutions conferring that degree. To show the inconsistency, with the very same breath the speaker says, "We will give the degree of Ph. G. minus practical experience." I claim that every person carrying the degree of Ph. G. should protest against lowering the standard of requirements for the conferring of that degree. No one, it does not make any difference where they stand, has attempted to dispute that the person who is a theoretically trained man, plus the practical training, is a better and more competent pharmacist than the theoretical one. So that there is no controverting the statement that conferring Ph. G. upon a theoretical man is lowering the standard of that degree.

MR. OLDBERG: It seems to be the rule in this discussion to preface one's remarks with personal history. I have been in the profession twenty years, and I was of the opinion—I don't know why I should call it an opinion really—but I gave my consent to the proposition that the degree of Graduate in Pharmacy carries with it a certain amount of practical experience in drug-stores. I take it, Mr. Chairman, that up to this time, those schools of pharmacy and colleges of pharmacy have required drug-store experience for that reason. They have not given it up at all. Within the last year or two they have been advocating it, and as a result, eleven pharmaceutical schools and colleges have required practical experience before graduation.

I wish to refer now to some of the general principles that have been mentioned in

this discussion, and some that have been omitted. There are two sides to the question. No one will deny the fact that when a young man has been in a drug-store for a year or two years, or three or four years, he has a superficial acquaintance with drugs and chemicals, and pharmaceutical terms, and with certain processes, with certain common implements, and so on, and that, therefore, whenever he enters the school or college of pharmacy, this knowledge of his, superficial as it is, is an aid to him. Now, no one denies that. It is a fact. But what should be stated on the other side of the question? Why should the young man go into the pharmacy to learn the practice and then the art of the business? Why should he not have a preparatory education which will make that efficient and intelligent? Is it possible that any man can maintain that the young man who goes into the drug-store without any knowledge whatever of chemistry, without any knowledge whatever of pharmaceutical manipulations, or of pharmaceutical preparations, is going to have a better apprenticeship, or a more intelligent apprenticeship than the young man who has attended a course in a college of pharmacy? It is repugnant to reason. Now, again, we believe that practical experience is necessary. I maintain that as emphatically as any one. It seems to me, however, that the principal reason for practical experience being necessary has hardly been touched upon at all. The reason for it is that the young man after he has gained a requisite knowledge and intelligence to practice, should learn the responsibility which attaches to the important work which he does. It is impossible to believe, too—I don't believe it because I know better—that a college course for education of any kind disqualifies any one from labor, or whatever it is, if it is useful labor. It is ridiculous in my judgment to say that because Thomas has been to a school of pharmacy he is useless, whereas, if he had gone into the drug-store before going to a college of pharmacy, he would have been efficient. It s simply stupid. A student who goes into a store to learn the work of pharmacy should have a knowledge of chemistry; he should have a knowledge of drugs and of pharmacy before he begins; then he will learn intelligently, and not blindly. I would like to have some one inform me during what hours, and how many hours the average druggist of to-day instructs his apprentice, when he has time to do it, and how much time does he devote to it, and if a young man during the first three years of his apprenticeship has an opportunity to learn anything that is particularly instructive. It does not require any college training, it is true, any special education, to learn to wash bottles, windows, mortars, and such things; but at the same time it is perfectly evident that the young man who knows chemistry and pharmacy and pharmacognosy, is not thereby disqualified from cleaning bottles, windows, mortars, etc. A chemist when he works in his laboratory is generally scrupulously clean. He makes messes once in awhile inevitably, and he knows the absolute necessity of cleaning up afterwards. I have been in the dispensing business, the retail drug business, for something over fifteen years. I have myself swept my floor, many and many a time. I have washed my own windows many a time, and I declare that the more a man knows, the better his education is, the better prepared is he to honor useful labor.

Mr. Hallberg: I believe both sides agree as to the value of experience. They object to it primarily because it is undefinable. They all agree to the fact that some fifteen or twenty years ago apprenticeship meant something. They all agree to the fact, and I believe one of them has compiled statistics showing that the numbers of educated pharmacists are constantly on the increase, in other words, that there are many more competent pharmacists now than there were ten or fifteen years ago, and at the same time we are told that the conditions of apprenticeship are not now what they were ten years ago. Now, gentlemen, I ask you how can you possibly put these statements alongside of each other. Take the city of Denver: How many Graduates of Pharmacy were there fifteen years ago in this city? Probably one or two. How many are there now? I

might say that the advantages of a young man in a drug store in Denver are greater to-day than they were fifteen years ago. I want to speak from the standpoint of an average pharmacist. I do not propose to convert any of the professors, for reasons which it is difficult for me to suppress. I want to ask whether the increasing number of young men now engaged in the drug business were drawn into it without knowing what they were doing or where they were going. I want to know if these schools shall be constituted a propaganda for drawing young men into the drug business on the hazy theory of learning pharmacy. I want to ask the State Pharmaceutical Associations of Indiana, of Iowa, of Michigan—we have heard from Kansas—whether the sentiments of these State Associations are represented by the expressions of their teachers in this department in these respective States. I believe they are not. I am satisfied that they are not. I know that if the Ohio Pharmaceutical Association, for example, had any voice in this matter, they would not pay the expenses of the institution. Here comes the Secretary of the Kansas Pharmaceutical Association, who voices the sentiment without any doubt of the Kansas Pharmaceutical Association, in direct opposition to the dean of the department, who lately stated that the matter was laid before the Faculty of the State University, and afterwards received the endorsement of the Board of Pharmacy. We venture the opinion that the Pharmaceutical Association is not in accord.

MR. SAYRE: I rise to a point of order. I wish to say that the gentleman is wrong in saying that there is direct opposition between the Secretary of the State Board and the Dean of the department of pharmacy in the Kansas University. If you will allow me—

THE CHAIRMAN: We cannot allow you any time now.

MR. SAYRE: I want to correct that, and deny that statement. That is not so.

MR. HALLBERG: I simply want to say that when gentlemen in the employ of the State come here for the purpose of extending their non-experience propoganda, it reminds me of a recent statement in a journal, as being more in the interest of the Dean of the particular college than in the interests of pharmaceutical education.

MR. OLDBERG: That is out of order.

MR. HALLBERG: If we were to accept the theory of Prof. Oldberg, we would be like an architect beginning a building by putting up the roof first.

MRS. MINER: I wish to say that Prof. Hallberg referred to having heard from the secretary of the pharmaceutical association. Prof. Sayre referred to the members of the State Board of Pharmacy, each one of whom, of course, is a member of this State Association. This question of changing the title of Ph. G. to Ph. C. was brought out in a very forcible manner at our last State Association. The State Association took no action upon it, but deferred action until out next annual meeting, in May. Now I wish to say that I think our State druggists and the practical men of our State in the profession would very much prefer that our State University do not make that change, although the State Board of Pharmacy has accepted the responsibility of the change.

MR. FENNEL: I want to endorse the sentiments of Prof. Hallberg, and I am glad to see a man here who has the moral courage to state his convictions and tell the truth. In the first place, if we take the proposition of practical experience fifty years ago and that of to-day, it is not the same thing, We must all admit that. You take the old colleges, you find them insisting on practical experience. That means something. Gradually other institutions will come in. What did they do? They dropped out the practical experience and reduced the standard. The old colleges have tried to maintain that practical experience and insisted on maintaining it. Other institutions have come in under

the university plan that are no longer private, while the old schools are private. They were forced to reduce their standard in order to uphold the institution in name only, and therefore I hope that this Association as a body will insist on practical experience, what it meant fifty years ago.

THE CHAIRMAN: I would like to entertain a motion pretty soon to close the discussion.

DR. MCGILL: One word. It is my opinion in regard to this matter that experienced men are better than inexperienced men. There is one point in the paper that was presented that I believe has not been touched upon, and I will speak of that. It was the statement that the college professors had as good opportunities of judging of the value of experience of the students in drug stores as the State Boards of Pharmacy. Now I think that is doubtful. The members of the State Board usually represent different portions of the State, and those who apply for admission or for registration to those Boards usually have served in drug stores somewhere in that State, and I think then that those five men have better opportunity to judge of the character of the experience that the men have had than the college professor, who, perhaps, is a thousand miles away—it may be in Boston or Philadelphia, where the students come from drug stores—in those States, that the professors can judge of the value of the experience there. But the majority of them, even in those places, come from the outside. How many of the four hundred who apply for graduation, for instance, in the Philadelphia College of Pharmacy, have come from that city, have served in drug stores that the professors know something about? The vast majority of them are from distant cities, perhaps, and so the officers themselves have no opportunity to judge really of the value of this experience; and it seems not right to me that the graduate then should have to wait several years before receiving his diploma until the certificate of Mr. Smith, or some gentleman from Texas, can be received, stating that he has had such and such an amount of experience in a drug store.

The value of the practical experience is not from the quantity in the mind, but from the quality of it. Now, one of the speakers just awhile ago said, that when we put our names to a diploma we do not certify to the qualtity of the experience. Now, then what is the great value attached to the diploma of the Ph. G., before he has had years of experience, if it does not certify to the quality? Professors in colleges should certify a diploma simply to the work that has been done under them, to the proficiency of the graduate in the branches which have there been stated. It seems to me they cannot conscientiously certify to more. I think this should be delegated to the State Boards themselves, who will have a better opportunity of judging as to that.

MR. REMINGTON: Do the State Boards have a better opportunity?

DR. MCGILL: They have, from the from the fact, in the first place, that a number of the members of the State Board are from the different portions of the State. They know all the drug-stores in the State, the qualities of the same, and generally those five have done the work in that State. But even if they have not a better Board, I cannot see how a conscientious professor can put his name to a diploma certifying that experience of the graduate in a drug store has been the proper one.

MR. HALLBERG: Is not a professor in a college, if he gives personal supervision to the instruction, particularly in the laboratory, during the period extending for perhaps two to six months' course, is he not more familiar with the real value and ability and qualities of that young man, than a member of the State Board of Pharmacy that meets in some out-of-the-way place, and has an hour or two for conference with this young man?

DR. MCGILL: He is of course more familiar with the qualifications of that young

man, as to the studies he has pursued, but not in regard to his experience in drug-stores, of which he knows nothing.

MR. REMINGTON: As the Philadelphia College of Pharmacy has been mentioned, I think I must say a word. I know that there has been a great deal of laxity in a good many of the colleges in regard to looking up the question of time. Since I have been Dean of the Philadelphia College of Pharmacy I have had an opportunity of knowing that there is a great deal of time expended, and a great deal of time devoted to the examination of the certificates of the various young men who come forward, on this matter of experience. I do not mean to say that the professors undertake any detective work, or go into any personal or private investigation, although as Dean of the college I have spent months in investigating certain cases in which I thought that the statements were not accurate. But we have a blank—I wish I had one here to show you—we have a blank which must be signed by the preceptor; the preceptor's name must be given in full; it must be witnessed; the exact length of time that the man has served in the drug and apothecary business; and the young man is compelled to testify to the truth of the correctness of that certificate before he is allowed to go up for examination. But I only want to correct the impression, it is an opinion which has been in the public print. It has been stated in pharmaceutical journals, and also by these various associations, that no effort is made to substantiate the correctness of the certificate. I don't want to say that it is impossible for a young man to slip through and put in a certificate that is not true. It might require some detective work and require a long time in order to prove that that man's certificate is not correct; but it is so made that if the preceptor is a man known in his locality to tell the truth, unless we have reason to believe that he is not telling the truth, or the least suspicion that there is anything wrong about a certificate sufficient to throw it out and an investigation has to be made, the burden of proof is upon the man to show that he has had experience in the drug and apothecary business.

MR. SAYRE: I want to say a word, because I have a certain feeling that I am in duty bound to explain. I want it distinctly understood that the Kansas State University, the State Board of Pharmacy, and the Kansas Pharmaceutical Association, are all working to the same end, namely, the elevation of pharmacy. The Kansas State University got the present Board to leave the department of pharmacy to the Kansas Pharmaceutical Association, and the Secretary of the Association itself has been with me in all of this time working with perfect harmony, and I hope that this Section will do nothing to disturb the pleasant relations which we have always had.

Upon motion, the paper last read was referred to the Committee on Publication.

The Section then adjourned, to meet again at 3 : 30 p. m.

SECOND SESSION—MONDAY AFTERNOON, AUGUST 19.

Chairman Good called the Section to order, and upon motion of Mr. Eliel, the reading of the minutes of the preceding session was dispensed with.

The Chair announced that the next order of business would be the election of officers for the ensuing year, and the Secretary read the names of the nominees for Chairman, Messrs. J. H. Beal, of Scio, Ohio; C. S. N.

Hallberg, of Chicago; for Secretary, Messrs. J. N. Hurty, of Indianapolis, Ind.; and E. H. Bartley, of Brooklyn, New York.

THE CHAIR: How shall we proceed with the selection of officers?

MR. HALLBERG: As there are two nominees, I do not see how we can proceed otherwise than by ballot.

DR. WHELPLEY: If there are no other nominees, I move that the nominations be closed and that we proceed to ballot.

Seconded and carried.

MR. BEAL: The reason I did not recall my name this morning was because I wanted to reserve to myself the pleasure of withdrawing after the closing of the nominations, and moving that the election of Mr. Hallberg as Chairman of the Section be made unanimous.

Seconded.

DR. WHELPLEY: I would move to amend so that the Chairman of the Section cast the vote of the Section for Mr. Hallberg for Chairman for the ensuing year.

A rising vote being taken resulted in the passage of the amendment by a vote of 20 to 7.

THE CHAIR: The Chairman has cast the affirmative ballot of the Section for Mr. Hallberg for Chairman for the ensuing year, and further nominations for Secretary are in order. The Secretary will please read the names of those who have been nominated.

THE SECRETARY: Mr. J. N. Hurty, of Indianapolis, and Dr. E. H. Bartley, of Brooklyn.

Mr. Oldberg nominated J. H. Beal, of Scio, Ohio.
Seconded by Dr. Whelpley.

MR. BEAL: I beg to be excused. I desire to withdraw my name in this connection.

THE CHAIR: Will the Association excuse the nominee?

MR. OLDBERG: With the consent of my second, I will withdraw the nomination.

THE CHAIR: I am under the impression that Professor Hurty was excused this morning. He withdrew his name most positively.

MR. HALLBERG: Yes sir, Professor Hurty withdrew his name, but the Secretary left it standing, as he did not know whether it was positive or not.

MR. OLDBERG: I move that the ballot of this Section be cast by the Secretary in favor of Dr. Bartley for Secretary for the ensuing year.

DR. WHELPLEY: We have never had more efficient work in this Section than during the past year, and whilst I am always opposed to re-election to the same office, and for that reason I was very much in favor in seeing the present Secretary elected as Chairman, and of seeing Professor Beal elected to the position of Secretary, I learn that when Professor Beal withdrew his name he thought that there were already two candidates in the field. I have not consulted him on the subject, but I would like to nominate Mr.

Beal again for Secretary. He has been one of the best workers we have had in this department, and I do hope for the good of the Association he will take hold of it, and I hope his name will go before the Association.

DR. BARTLEY: I desire to withdraw my name in favor of Mr. Beal. I am not sure that I shall be in the country next summer at the time of the next meeting, and I am hoping that I shall not; therefore, I prefer that Professor Beal's nomination be made unanimous.

THE CHAIR: Dr. Bartley is excused.

DR. SIMON: As we have practically but one nomination, I move that the Secretary cast the ballot of the Section in favor of Mr. Beal for Secretary for the ensuing year.

Seconded and carried.

THE CHAIR: Your officers for the following year will then be Mr. Hallberg as Chairman and Mr. Beal as Secretary. The next thing in order will be the reports of committees. What committees are there to report, Mr. Secretary?

THE SECRETARY: We have the continuation of the Secretary's Report covering the registration certificates, showing, with two or three exceptions, the number of candidates for registration and the number that have been registered by every Board of Pharmacy in the United States. It will take only a few minutes to make a synopsis of this, and it may have a bearing on some other question.

THE CHAIR: The Secretary will please give us a synopsis of those statistics.

THE SECRETARY: We could get no returns whatever from the State of New York, and the local boards we did not endeavor to get returns from. I shall now, therefore, only give a summary. Maryland: The law applies only to Baltimore, and we have no returns from Maryland. Montana: The law has just been enacted this spring. Pennsylvania we could not get any returns from, but just before leaving for the meeting one member of the Board finally succeeded in getting a few statistics. Texas it was impossible to get any returns from because there is a Board of Pharmacy for every judicial district of the State, but I have written to various pharmacists of Texas and I have written to the Secretary of State of Texas and to a number of other persons, and I have never been able to obtain any information whatsoever regarding the pharmacy law of Texas. The same applies to Idaho, the pharmacy law has just been enacted. In Wyoming the law has been a dead letter for the last five years. We therefore have as a summary the following: Total number of candidates for registration as pharmacists, 5,273; for the fiscal year 1894–1895, 945. Now we have estimated the proportionate number from the places that have not been heard from, and by estimating them at 1,500 we have a total of 6,773. The total number registered is 2,721, or based upon the proportion here, 3,521; a little more than fifty per cent. have been registered from the candidates that have applied for registration, 3,500 in round numbers for the year, in all the States. The registration of assistants is incomplete, because there are comparatively few states as yet that have this second grade. In fact we have only obtained the information that there were 1,228 applicants for registration as assistants, and of these 860 were registered. We have also obtained statistics of the number of those registered who were graduates, but these are incomplete; here is the report in full. On the question of registration of apprentices there are only two States with this law, Arkansas and Illinois, to go into effect January, 1896, and two States where the qualification is the age of eighteen, Arkansas and New Hampshire; in Oklahoma it is twenty-one.

REGISTRATION STATISTICS—FROM SECRETARY'S REPORT, 1895.

COMMITTEE ON EDUCATION AND LEGISLATION.

The Committee, realizing the necessity for data concerning the registration of pharmacists, solicited answers to the queries 4, 5 and 6 from all the Secretaries of State Pharmacy Boards.

While the report is far from satisfactory or complete, it is believed that from the beginning now made, annual statistics should be collected, showing how this important feature of legislation is progressing.

It is hoped that Pharmacy Boards will keep correct records of the conditions here specified. To these may be added:

The number registered on Medical Diplomas.

The number registered on Time Service or Experience.

The number registered through Interchange of Certificates.

In order to obtain a fairly accurate summary of the number of candidates and those registered as pharmacists, we have carefully estimated and added the number from several delinquent State and County Boards:

SUMMARY.	Total from returns.	Additions estimtaed.	Total.	Per cent. registered.
REGISTRATION OF PHARMACISTS OR LICENTIATES FOR 1894.				
a. The total number of candidates for registration as R. Ph's or Licentiates.	5273	1500	6773	
b. The total number registered as R. Ph's or Licentiates	2721	800	3521	53
c. The number of graduate candidates.	305			
d. The number of graduates registered on diploma	265			
e. The number rejected on diploma	30			
f. The number of graduates registered by examination	60			
g. The number rejected by examination	21			
h. The number of non-graduates registered by examination	769			
REGISTRATION OF ASSISTANTS.				
i. The total number of candidates for registration	1228			
k. The total number of persons registered as assistants during the year 1894.	860			
l. The number of graduate candidates.	5			
m. The number of graduates registered on diploma	3			
n. The number rejected	0			
o. The number of non-graduates registered by examination	147			
REGISTRATION OF APPRENTICES.				
p. The number of apprentices.				
r. The educational requirements.				
s. The age.				

REGISTRATION OF PHARMACISTS AND ASSISTANTS FOR 1894.

By the Pharmacy Boards of the United States.

State.*	Registered Pharmacists.									Assistants.							Apprentices.		
	total	*a*	*b*	*c*	*d*	*e*	*f*	*g*	*h*	total	*i*	*k*	*l*	*m*	*n*	*o*	*p*	*r*	*s*
Alabama	678	32	27	32	5	..	22	5											
Arizona	No returns.																		
Arkansas	.....	31	18	5	5	..	..	..	13 ...	.....	.....	.....	..	..	..	...	11	..	18
California	1250	139	89	47	47	..	..	..	42 ...	.....	65	46							
Colorado	.....	83	40	...	...	..	..	..	... ...	.....	*aa*	30							
Connecticut	639	88	57	...	10	..	..	..	47										
Delaware	215	....	19	...	...	..	..	..	... ...	176	*bb*	20							
District Columbia	.....	33	29	17	17	..	..	..	12										
Florida	.....	30	24	3	3	..	..	..	21										
Georgia	.....	86	61	29	19	10	6	2	26 *cc*										
Idaho	County Boards.																		
Illinois	.....	728	293	...	...	..	..	..	... *dd*	.....	547	365	..	..	..	...	*bb*		
Indiana	No law.																		
Iowa	.....	510	220	4	4	18	6	12	202 ...	.....	*aa*								
Kansas	.....	154	90	26	26	..	..	..	64 ...	.....	43	30	1	..	..	29			
Kentucky	.....	84	60	...	12	..	3	2	28										
Louisiana	.....	82	54	11	11	..	..	..	17 ...	.....	23	13		..	..	11			
Maine	.....	44	12	...	...	..	..	..	... ...	.....	....	4							
Maryland	Baltimore only.																		
Massachusetts	.....	562	102	...	...	..	..	..	... *ee*										
Michigan	.....	232	101	...	...	..	..	..	... ...	.....	70	43							
Minnesota	.....	216	63	9	...	..	..	..	41 *ff*	.....	151	54	..	..	..	52	*bb*		
Mississippi	914	25	22	5	...	..	5	1	17										
Missouri	.....	449	333	72	72	..	..	..	59 *hh*										
Montana	199	New law.		...	...	..	..	..	... ...	9									
Nebraska	.....	117	75																
Nevada	No law.																		
New Hampshire	.....	45	16	...	...	..	..	..	16 ...	.....	11	11	..	..	..	11	*bb*	..	..	18
New Jersey	.....	....	100																
New Mexico	.....	14	8	5	5	..	..	..	3										
New York—																			
New York City, Kings, Erie	.....	457	336	...	...	..	..	..	... *ii*	.....	....	15							
North Carolina	.....	30	19																
North Dakota	.....	36	26	...	5	..	2	..	10										
Ohio	.....	371	155	...	...	..	..	..	... ...	.....	169	61							
Oklahoma	.....	277	159	19	18	1	..	..	73 ...	.....	1	....	..	..	..	...	..	.	21
Oregon	.....	21	12	...	...	..	..	..	... ...	.....	15	8							
Pennsylvania	.....	523	203	...	...	..	..	..	... ...	.....	430	213							
Rhode Island	.....	1	1	...	...	..	..	..	1 ...	.....	51	26	3	3	..	23			
South Carolina	.....	13	7																
South Dakota	.....	49	35	4	2	..	2	..	31 ...	.....	14	14	..	..	..	14			
Tennessee	.....	25	12	...	...	..	..	..	... ...	.....	....	16	..	..	..	4	*bb*		
Texas	No returns.																		
Utah	.....	25	19	4	3	1	..	1	16 ...	.....	6	4	1	..	..	3			
Vermont	New law.																		
Virginia	.....	55	17	...	...	..	..	..	... ...	.....	24	13							
Washington	.....	50	30	8	8	..	..	..	13 *ii*	.....	14	10							
West Virginia	.....	60	50	5	5	..	..	..	45										
Wisconsin	.....	103	50	...	...	..	17	..	... ...	.....	94	77							
Wyoming	Law not enforced.																		
Total for Year	.....	5879	3064	305	265	30	60	21	769 ...	.....	1658	1088	5	3	..	147			

aa. Proportional examination; no distinction between pharmacists and assistants in examination.

bb. Assistants registered on from two to three years' continuous practical experience.

cc. Nineteen registered on medical diploma; graduated before 1887.

dd. Eighty-nine registered on five years' experience.

ee. *a* refers to number of applications, not individuals.

ff. *c* refers to medical diplomas; thirteen certificates interchanged.

hh. One hundred and eighty-nine physicians registered, 1894; law since changed; diplomas not recognized; thirteen certificates interchanged.

ii. Washington, nine registered by certificate interchange; New York, thirty-four.

* No returns from Idaho, Kentucky, Maryland (Baltimore only), New York City, Kings and Erie counties, Pennsylvania, Texas. In the following, laws have been enacted during the year, hence no returns: Montana, Vermont. These have no pharmacy laws: Arizona, Indiana, Nevada. Law not in effect in Wyoming.

Upon motion of Mr. Ryan, the Secretary's report was received and referred to the Committee on Publication.

THE CHAIR: We have another important committee, and the Secretary will read the resolution creating that Committee.

THE SECRETARY: *Resolved*, That a Committee be appointed consisting of one representative from each of the colleges and schools of pharmacy of this country represented by members in this Association, with three members of the Association, neither of whom are teachers in any pharmaceutical school or college. The duty of said Committee shall be to take into careful consideration the condition of pharmaceutical education in this country, make recommendations relative thereto, and report to the Association at its next annual meeting.

THE CHAIR: A committee was appointed according to that resolution. That committee has performed its labors and is ready to report. Mr. Sheppard is chairman of that Committee, and I will ask for his report.

Mr. Sheppard read the following report:

Resolved, That it is the sense of the American Pharmaceutical Association that the cause of pharmaceutical education would be advanced if all pharmaceutical schools that confer the degree of Graduate in Pharmacy should adopt the following suggestions:

1. That the standard for admission shall not be less than the equivalent for admission to the public high schools of the larger cities of the United States.

2. That each student shall attend not less than two courses of didactic instruction, each course extending over a period of not less than twenty-eight weeks, the student to be in attendance for not less than six hours of such instruction in each week, and not less than one hundred and sixty (160) hours in each session. That the time devoted to this instruction shall be limited to the subjects of Pharmacy, Chemistry and Materia Medica or Botany, and not include that in collateral branches. That not less than three hundred hours of laboratory work shall be required of each student in each term.

3. That every student, in order to graduate, should be familiar with all the teachings of the United States Pharmacopœia, and fully capable of performing all operations mentioned in it.

4. That as far as practicable students shall give their whole time to the work of the college during its sessions, and not divide their time between work in a store and work in a college. That no student shall be retained at college whose outside duties will not permit him to do full justice to his studies or laboratory work.

5. That students should not be admitted to the school or college at less than eighteen years of age; and that the degree should not be conferred upon any person who is less than twenty-one years of age at the time of completing his final course.

6. That the degree of Ph.G. should be conferred upon any person who has successfully passed the required examinations, without any regard to practical experience in a drug store.

THE CHAIR: Were the words, "without any practical experience in a drug store" included?

MR. SHEPPARD: That is the original that was passed.

THE CHAIR: You have heard the report of this committee; what is your pleasure in regard to it.

MR. OLDBERG: I move that the report be received, Mr. Chairman.

DR. WHELPLEY: The report of this committee in bringing before the Association certain recommendations, all relating to the qualifications or course that should be pursued for the degree of Ph.G., the committee refusing to consider another degree which is conferred, I believe, by as many institutions as Ph.G.; that is, the grade of Ph.C., and also the degree of Doctor in Pharmacy, which is conferred by one or more institutions, it seems to me as if the committee in doing this has limited its work to a small portion of what was outlined, and I would move that this report be laid upon the table.

Mr. Ebert and others seconded the motion. A division being demanded, the motion was adopted by a rising vote of 28 to 8, and amid applause the motion to table was declared carried.

MR. REMINGTON: I merely wish to say that we are now in exactly the same position that we were a year ago.

MR. EBERT: I hope that hereafter we will let these schools and colleges of pharmacy take care of themselves. (Applause.)

THE CHAIR: Are there any other reports that the Secretary is aware of? Is the Committee on the Chairman's Address ready to report?

(The Committee not being ready to report, the Chair said?)

I will state for the information of the Section that the members of the Committee on the Chairman's Address are Messrs. Sheppard and McGill, and Mrs. Miner. I had made the nominations before adjournment, but neglected to announce it. The nomination was not really made during the recess, it was simply a neglect on my part to announce it, but as they are still in session in the Committee Room, if any one wishes to influence the report of that Committee they know who they are.

MR. MAYO: The Section on Scientific Papers adopted the following general rule, and I move its adoption by this Section as well:

"No author shall be allowed more than fifteen minutes for the reading of any one paper, save by consent of a majority of the Section. If any paper requires more than fifteen minutes for presentation, the author shall be required to present it in abstract.

"In presenting papers, preference shall be given to those the authors of which are present.

"The Executive Committee of the Section shall distribute at the first general session of the Association all papers which are in print, and shall, at the earliest practicable time, put in a conspicuous place a bulletin stating when the several papers are to be presented."

The idea of the rule is to let the members know when the papers are liable to come up, and to promote the discussion of them. I offer that as a general rule of the Section, and move its adoption.

Seconded by Mr. Alpers and carried.

MR. SHEPPARD: Our discussions up to the present time have seemed to run entirely on the subject of education. This is the Section of Education and Legislation, and I have here a motion that has a bearing on legislation. It seems to me very desirable that there should be an advancement along the line of the work of the Boards of Pharmacy, and that this Association can perhaps help along that good work by stimulating public opinion in the direction that Boards of Pharmacy should not receive candidates for examina-

tion unless those candidates can show that they have had some pharmaceutical training. I think that Boards of Pharmacy have now been in existence long enough to take an advanced position on that point; and this resolution which I am abont to offer is simply to express the sense of this Association in that direction, and to stimulate Boards of Pharmacy:

"WHEREAS, The American Pharmaceutical Association has already unanimously voted that attendance upon a course of instruction at a college or school of pharmacy should be required for registration (See 1894 Proceedings, page 353); therefore,

"*Resolved*, That it is the sense of the Association that regular attendance upon at least six hundred hours of instruction at a pharmaceutical school or college should be considered as a necessary preliminary qualification for examination by State Boards of Pharmacy."

THE CHAIR: You have heard the reading of this resolution, which is in the form of a recommendation. What is your pleasure in regard to it?

DR. WHELPLEY: I second the motion.

THE CHAIR: The resolution has been seconded. I hope that you fully understand the purport of it.

MR. SHEPPARD: Perhaps I might explain it a little. It does not require the candidate to pass any examination whatever. It simply requires him to furnish to the Board evidence that he has had six hundred hours of instruction in a school, regardless of how much he has profited by that instruction.

MR. ALPERS: Does that mean in a pharmaceutical school?

MR. SHEPPARD: Any pharmaceutical school.

MR. WATSON: When this subject came up at the White Mountains meeting it was the sense of this Association then that it was not expedient. We all agree with the spirit of the motion, but it is calculated to produce a prejudice. and would do more harm than good.

THE CHAIR: If Mr. Watson will allow me a moment, the question we discussed at that time was that an applicant for registration should be a registered pharmacist. This resolution does not go so far.

MR. WATSON: I don't think it is in good form to introduce this subject at all. Not but that I fully agree with the spirit of it; but it is a fact that there are hundreds and thousands of men who did not go to a school of pharmacy, and some of the best men in the country; and some of those in the small towns haven't the means to attend a college of pharmacy for a year, but by long years of training in their stores and in their fathers' stores and in their uncles' stores have become fairly good druggists, good enough for their sections; and to pass this resolution would look to me like creating a prejudice against this class of druggists.

MR. PRESCOTT: We all understand, do we not, that this would not affect those already registered in any of the States?

THE CHAIR: Certainly; that is true.

MR. PRESCOTT: We also understand, I suppose—very many of you know more about the consideration of this question, I know very little about it, in the Councils of this Association—but, of course, it is manifest that such a recommendation on the part of this Association, however helpful it may be to the country, is not likely to go into effect so rapidly that the suddenness of it would do any great harm. (Laughter.)

MR. SHEPPARD: Dr. McGill has a set of resolutions prepared on the same subject, one of which is exactly in accord with my own, and therefore I would be perfectly willing to withdraw mine.

The consent of the second being obtained to the withdrawal of Mr. Sheppard's resolution, the Chair announced that he would recognize Dr. McGill, and the following substitute resolution was read:

"*Resolved*, That the American Pharmaceutical Association recommend to the State Pharmaceutical Associations and to State Boards of Pharmacy that they endeavor to obtain such amendments to the Pharmacy Laws as shall require the following qualifications precedent to the registration and licensing of pharmacists:

1. An academic education equivalent to that required for admission to the public high schools of our larger cities.

2. A professional education in the branches of study taught in the best pharmaceutical schools equivalent to that acquired by regular attendance upon at least six hundred hours instruction in such a school during a period of not less than six months.

3. A practical experience in pharmacy of at least thirty-six months, including the time spent in regular attendance upon a school of pharmacy of good standing having adequate laboratory courses.

The motion being put to adopt this resolution of Dr. McGill, after alterations made by the Secretary while reading, in accordance with suggestions of Mr. Alpers and Mr. Sheppard, which were accepted by Dr. McGill, the resolution was adopted, reading as above.

The Chair having called for the Report on Legislation, the Secretary said:

There was no report of this kind last year, and consequently this report covers two years. The report is exceedingly voluminous, and I shall in a few words give only the greatest changes that have been made.

The following is the report in full:

REPORT ON PHARMACY LEGISLATION.

The following States report changes in or enactment of Pharmacy Laws:

ALABAMA. The following was enacted by the last legislature and an attempt to repeal it will be made by the Alabama Pharmaceutical Association:

An Act to define the authority of physicians in the sale of or dispensing of medicines and drugs—Be it enacted by the general assembly of Alabama, that all regularly graduated physicians, who have complied with the laws of the State, as they now are, entitling them to practice medicine, are also hereby authorized to fill prescriptions of other physicians, compound medicines and poisons and sell the same, and to carry on the business of a druggist or a drug store or apothecary shop.

COLORADO. Increasing the penalty for violating the Section pertaining to persons practicing pharmacy without a license from $25 to $250. March, 1895.

CONNECTICUT. Amending Section 3118 so that the Commissioners of Pharmacy shall consist of three pharmacists instead of one physician and two pharmacists.

Section 3125. Amended so that commissioners may expend not to exceed $200 for laboratory supplies and $100 for clerical services. 1895.

DELAWARE. Amended section prohibiting physicians from dispensing medicines in the city of Wilmington, except when having in their employ a qualified assistant pharmacist. This Act went into effect July 1, 1893.

GEORGIA. Amendment abolishing annual renewal fee and restoration of former requirement, viz.: payment of a license fee of $15.

ILLINOIS. A new law enacted, in force July 1, 1895. It differs from the former Act chiefly in the following: In requiring that every registered pharmacist taking in his employ a person for the purpose of learning pharmacy shall file with the Board of Pharmacy a report on the school attainments of such person. That none except registered pharmacists, assistants or apprentices shall be permitted to sell any drug, medicine or poison, and that the packages in which such are sold must bear the name of the registered pharmacist by whom sold.

MAINE. An amended Act, March 23, 1893.

MARYLAND. A law for the State failed of enactment; the present law applies only to Baltimore.

MASSACHUSETTS. In his annual address President Harris of the State Pharmaceutical Association said: "The report of the committee on legislation will be of special interest, as, since our last meeting, the law giving the board of registration the power to grant certificates entitling the holders to receive a liquor license from the local authorities has been put in force. No legislation since the law of 1885 has produced the disturbance in our ranks that the enforcement of the provisions of this law has. The best evidence that this is a long step in the right direction is the stir it has created, for a law that does not bind somewhere amounts to nothing. I believe that the issuing of licenses to druggists should be taken out of the hands of the local authorities entirely, and vested in the board of registration, or a new board created for this special purpose. In this way the humiliation of having to parade our names for days in our local papers, together with a lot of promiscuous applications for licenses, can be avoided. Also the deadlocks which have occurred in different parts of the state, especially in a no-license year, when the authorities refused to grant any licenses, no matter what the standing of the applicants, would be removed. One thing every pharmacist who has the best interests of his calling at heart must bear in mind: that is, that the liquor part of their business is being, and must be, slowly crowded out. Public sentiment has changed greatly in the last few years, and instead of all being classed alike, the line has been sharply drawn, and the stores that sell the least amount of liquor that they possibly can are gaining the confidence and esteem of the public, and consequently their business is growing from year to year, while the others are losing ground and dropping lower and lower.

MICHIGAN. The law not requiring practical experience, the Board has made this a requirement for registration. Its report says: "The large per cent. of applicants for registration who were entirely without practical knowledge of the duties of the pharmacist, whose information was derived from quiz compends, and in schools established to coach students for examination without regard to practical work, rendered necessary in the opinion of the Board, for the protection of the public, the adoption of a rule requiring practical experience under a competent pharmacist, before granting a certificate of registration. This rule, we believe, will have a good effect in making the licentiates of this board more efficient pharmacists. We are pleased to report that the regulation meets with the hearty indorsement of the druggists of the state." It also names an educational requirement equivalent to a grammar school standing.

MISSOURI. On the 21st of June, 1895, the Amendment 4625 *a*, and Section 2, passed by the 38th General Assembly, went into effect, and since that day no diplomas, pharmaceutical or medical, and no certificates of other State Boards of Pharmacy, entitle to registration. Every person desirous to engage in the drug business in Missouri must pass the examination of this Board to be registered. Pharmacists legally registered prior

to said date are not affected by the amendments. The annual renewal of certificates (re-registration) is not required by law.

MONTANA. Pharmacy law passed March 9, 1895.

NEBRASKA. Amendment to Pharmacy Act, a proposed draft for regulating the sale of poison and repealing a section of the Criminal Code, failed of enactment.

NEW JERSEY. An important provision in Section 8, limiting the exemptions of the law to: the strictly professional pursuit of any physician, the making or vending of non-poisonous patent or proprietary medicines, and the sale of simple non-poisonous domestic medicines by retail dealers in rural districts, etc.

NEW YORK. A measure to consolidate the local Boards failed of enactment. Also three bills failed to become laws: (1) Restricting the sale of opium, chloral, and cocaine; (2) Requiring poisons to be dispensed in fluted bottles; (3) Requiring the formula to be printed on patent medicines.

OHIO. Food, drink and drug laws, passed 1886, amended 1891 and 1892. Dairy and Food Commissioner.

PENNSYLVANIA. Section 11, granting registration to physicians, was repealed March, 1893. Amendments in 1895: Making it a penal offence to fail exhibiting certificate; increasing registration fee to $3 triennially; increasing examination fee from $2 to $3, with additional fee of $1 for registration in the first instance; increasing the Secretary's salary to $300 per annum.

SOUTH CAROLINA.—Law amended so as to require examination of physicians who desire to practice pharmacy.

TENNESSEE. Act of 1893 amended in 1895.

Section 3. Providing that every registered pharmacist or assistant, upon changing his place of business or removing from the State, shall notify the Secretary of the Board. Every registered person is also required to advise the Secretary June 30th annually whether or not he desires to continue in practice at the place he registered from. After having been notified by the Secretary by mail, the persons who have not renewed registration within 30 days of such notice shall have their names stricken from the roll.

TEXAS. Attempt to create a State Board to replace the District Boards failed, although supported by the State Association.

VIRGINIA. Law amended so as to permit physicians registered by the Virginia Board of Health, and of five years' practice, to register as pharmacists; all others must be examined. The Board of Pharmacy has promulgated the following rule:

Apprenticeship Requirement.

It is resolved and ordered—

1. That from and after July 1, 1895, every boy entering the drug business for the purpose of learning it and becoming a licentiate of this Board shall be required to exhibit to his employer a certificate from a school teacher or superintendent of schools, actively engaged in their professions, setting forth the fact that he has passed a regular examination in the ordinary branches of an English education, including grammar, composition and spelling; reduction, simple and compound proportion, vulgar and decimal fractions, square root and area of rectilinear figures in arithmetic; in algebra, elementary rules, greatest common measure, least common multiple, fractions, and simple equations of one unknown quantity, and physical and mathematical geography, as well as a knowledge of the rudiments of Latin grammar.

2. That said school teacher's or superintendent's certificate, with one from the employer, certifying as to the engagement of the person named, shall be transmitted to the Secretary of the Board, who shall keep them on file for future reference, and also keep a record of the same in a book especially reserved for that purpose.

3. That the Secretary shall prepare and have printed blank forms in accordance with the above requirements, and furnish them to apprentices on application, said forms to

give the name of employer and school teacher or superintendent, with date and address, and be signed by the applicant, who will also state his age and color.

4. That in the event of failure or neglect on the part of an employer to require an apprentice to comply with these resolutions, or in the event of an adult deciding to enter the business without previous apprenticeship, the Board will reserve to itself the right to decide upon the educational abilities of such person when he shall appear before it as a candidate for registration.

5. That in the event of the death or change in business of an employer, or an apprentice finding it necessary to change his employer or location of business, he shall notify the Secretary of the Board of the fact within thirty days from the date of change, and the Secretary shall note said change in his record book. But, in the event that said apprentice fails to notify the Secretary of the change in his relations with his employer, the time between the date of change and his formal notice thereof—if exceeding one month—on his appearance before the Board as a candidate for registration, shall be deducted when computing the term of apprenticeship, unless the Board shall be satisfied with his reasons for failure to comply with this resolution.

6. It is understood that where the words "boy" and "he" appear in these resolutions, the words "female" and "she" shall be substituted therefor whenever a female shall apprentice herself to a pharmacist.

WISCONSIN. An amendatory act replacing the laws of 1885 and 1887 was passed April, 1895. The registration by diplomas is repealed. The only exemption from articles sold exclusively by registered pharmacists are physicians dispensing their own medicines, the exclusively wholesale business of any dealer, and the making and vending of proprietary medicines in sealed packages with the names of the contents, the directions for using and the pharmacist in this State or physician by whom prepared or compounded, thereon.

WYOMING. Law dead letter.

ILLINOIS.

A BILL FOR AN ACT ENTITLED AN ACT TO REGULATE THE PRACTICE OF PHARMACY IN THE STATE OF ILLINOIS. ORIGINAL ACT APPROVED MAY 30, 1881. AMENDMENTS THERETO APPROVED JUNE 4, 1889.

AMENDMENT TO THE PHARMACY LAWS.

SECTION 1. *Be it enacted by the People of the State of Illinois, represented in the General Assembly*, That an act entitled "An act to regulate the practice of pharmacy in the State of Illinois," approved May 30, 1881, in force July 1, 1881, as amended by act approved June 4, 1889, in force July 1, 1889, be amended to read as follows:

That it shall be unlawful for any person not a registered pharmacist within the meaning of this act to open or conduct any pharmacy, dispensary, drug store, apothecary shop or store, for the purpose of retailing, compounding or dispensing drugs, medicines, or poisons, and any person violating the provisions of this section shall be liable to pay a penalty of not less than twenty nor more thad one hundred dollars for every such violation. *Provided, however*, that nothing herein contained shall apply to nor in any manner interfere with the practice of any physician, or prevent him from supplying to his patients such articles as may seem to him proper; nor with the exclusively wholesale business of any wholesale druggist; nor with the sale of patent or proprietary medicines and domestic remedies by retail dealers in localities where there are no drug stores, as hereinafter provided.

SEC. 2. That it shall be unlawful for the proprietor of any drug store or pharmacy to allow any person in his employ except a registered pharmacist or a registered assistant pharmacist to compound, recommend, dispense or sell at retail, drugs, medicines or poisons, or except an apprentice under the immediate supervision of a registered phar-

macist, as hereinafter provided. Any person violating the provisions of this section shall be liable to a fine of not less than ten or more than fifty dollars for each and every such offense.

SEC. 3. The term drug store or pharmacy shall for all purposes of this act be construed to mean a store, shop or other place of business where drugs, medicines or poisons are compounded, dispensed or sold at retail.

SEC. 4. Registered pharmacists, by examination, must be persons not less than twenty-one years of age, who have had four years' practical experience in compounding drugs in drug stores where the prescriptions of medical practitioners are compounded, and have passed a satisfactory theoretical and practical examination before the State Board of Pharmacy, hereinafter mentioned. The said Board may, in their discretion, grant certificates of registration to such persons as shall furnish, with their application, satisfactory proof that they have been registered by examination in some other State. *Provided*, That such other State shall require a degree of competency equal to that required of applicants in this State. Every applicant for registration as a registered pharmacist shall pay to the Secretary of the Board the sum of five dollars. *Provided*, That in case of failure of any applicant to pass a satisfactory examination, one-half of this fee shall be refunded.

SEC. 5. Registered pharmacists on time service must be persons not less than twenty-one years of age, who shall furnish satisfactory evidence to the State Board of Pharmacy that they have had five years' practical experience in compounding drugs in a drug store or pharmacy where the prescriptions of medical practitioners are compounded. The said Board shall have the right to refuse registration to applicants whose credentials are not satisfactory evidence of their competency. Each applicant for registration under this section shall pay to the Secretary of said Board the sum of five dollars before receiving his certificate of registration. Said certificate shall be operative in and apply to the towns of not exceeding 300 inhabitants, place or locality for which granted, and no other.

SEC. 6. Any person shall be entitled to registration as an assistant pharmacist who is of the age of eighteen years, of good moral character, temperate habits, and has had three years' service under a registered pharmacist, and the time of attendance at any respectable school of pharmacy shall be accredited on the above time, or shall pass an examination before the State Board of Pharmacy that shall show competency or qualifications equal to such service. Each applicant for registration as assistant pharmacist shall pay to the said Board the sum of five dollars before receiving his certificate of registration. Said Board shall have the right to refuse registration to applicants whose examination or credentials are not satisfactory evidence of their competency, and in case of failure to pass the required examination, one-half of the fee shall be refunded. Any assistant pharmacist shall have the right to act as clerk or salesman in a drug store or pharmacy during the temporary absence of the owner or manager thereof.

SEC. 7. The Board of Pharmacy may in their discretion issue permits to persons, firms or corporations engaged in business in villages or other localities where there is no drug store or pharmacy, empowering them to sell the usual domestic remedies and proprietary medicines under such restrictions as the Board of Pharmacy may deem proper. Each applicant for this permit shall pay to the said Board the sum of two dollars before said permit shall issue. Said permit shall specifically state just what the holder thereof is allowed to sell.

SEC. 8. It shall be the duty of registered pharmacists who take into their employ an apprentice in pharmacy, to report to the Board such facts regarding his schooling and preliminary qualifications as the Board may require for the purpose of registration. The Board shall furnish proper blanks for this purpose and issue a certificate of registration as a registered apprentice to such apprentices (without cost).

SEC. 9. Every registered pharmacist who desires to continue the practice of his profession, shall annually during the time he shall continue in such service, on such dates as the Board of Pharmacy may determine, of which date he shall have thirty days notice by said Board, pay to the Secretary of the Board a registration fee, to be fixed by the Board, but which shall in no case exceed $1.50, for which he shall receive a renewal of said registration. The failure of any registered pharmacist to pay said fee shall not deprive him of his right to renewal upon payment thereof; nor shall his retirement from the profession deprive him of the right to renew his registration should he within five years thereafter wish to resume the practice, upon the payment of said fees. Registered assistants, upon receiving notice as aforesaid, shall, if they desire to renew their registration, pay to the Secretary of said Board an annual fee of one dollar. *Provided, however*, That the Board of Pharmacy may refuse registration, or may suspend the certificates of registered pharmacists, or assistant pharmacists who are proven to be so addicted to the excessive use of stimulants or narcotics as to render them unsafe to handle or sell drugs, medicines and poisons. The holders of permits shall pay the sum of one dollar annually for the renewal of said permit.

Every certificate of registration granted under this Act shall be conspicuously exposed in the pharmacy to which it applies, and the name of the registered pharmacist who conducts the drug store or pharmacy shall be conspicuously displayed over the door or [over] *department?* Any person violating any provision of this Section shall be liable, upon conviction thereof, to pay a penalty of not less than twenty dollars nor more than fifty dollars.

SEC. 10. The Governor, with the advice and consent of the Senate, shall appoint five persons from among such competent registered pharmacists in the state as have had ten years' practical experience in the dispensing of physicians' prescriptions, and who are actively engaged in the practice of their profession, who shall constitute the Board of Pharmacy. The persons so appointed shall hold their offices for five years or until successors are appointed and qualified. *Provided*, That the terms of the office shall be so arranged that the term of one shall expire on the thirtieth day of December of each year, and the vacancies so created, as well as all vacancies otherwise occurring, shall be filled by the Governor, with the advice and consent of the Senate: *And provided also*, That appointments made when the Senate is not in session may be confirmed at its next ensuing session. The Illinois Pharmaceutical Association shall annually report directly to the Governor, recommending the names of at least three persons whom said Association shall deem best qualified to fill any vacancies which shall occur in said Board.

SEC. 11. The said Board shall, within thirty days after its appointment, meet and organize by electing a president from among their members, and a secretary, who shall not be a member of said Board. The Board shall also elect a treasurer, who shall be a member of the Board. Said Board shall prescribe the duties and compensation of such treasurer, and shall require the said treasurer to give such bond as the said Board shall direct. The secretary shall pay over to the treasurer all moneys that shall come into his hands as secretary. It shall be the duty of the Board to examine all applications for registration submitted in proper form; to grant certificates of registration to such persons as may be entitled to the same under the provisions of this act; to cause the prosecution of all persons violating its provisions; to report annually to the Governor and to the Illinois Pharmaceutical Association upon the condition of pharmacy in this state, which said report shall also furnish a record of the proceedings of the said Board for the year, and also the names of all the pharmacists duly registered under this act. The Board shall hold meetings for the examination of applicants for registration and the transaction of such other business as shall pertain to its duties, at least once in six months; *Provided*, That said Board shall hold meetings at least once in every year in the city of Chicago, and in the city of Springfield, and it shall give thirty days' public

notice of the time and place of such meeting; shall have the power to make by-laws for the proper fulfillment of its duties under this act, and shall keep a book of registration, in which shall be entered the names and places of business of all persons registered and holding permits under this act, which book shall also specify such facts as said persons shall claim to justify their registration. Three members of said Board shall constitute a quorum.

SEC. 12. The Secretary of the Board shall receive a salary which shall be fixed by the Board, and which shall not exceed the sum of fifteen hundred dollars ($1,500) per year; he shall also receive his traveling and other expenses incurred in the performance of his official duties. The members of the Board shall receive the sum of $5.00 for each day actually engaged in this service and all legitimate and necessary expenses incurred in attending the meetings of said Board. Said expense shall be paid from the fees and penalties received by the Board under the provisions of this act, and no part of the salary or other expenses of the Board shall be paid out of the State treasury. All moneys received in excess of said per diem allowance and other expenses above provided for shall be held by the Treasurer as a special fund for meeting the expenses of said Board, and the cost of an annual report of the proceedings of the Illinois Pharmaceutical Association and the necessary expenses of said Association. The Board shall make an annual report to the Governor and to the Illinois Pharmaceutical Association of all moneys received and disbursed by them pursuant to this act.

SEC. 13. No person shall sell at retail any drug, medicine or poison, without affixing to the box, bottle, vessel or package containing the same, a label bearing the name of the article distinctly shown, with the name and place of business of the registered pharmacist from whom the article was obtained: *Provided*, That the requirement in this section as to label shall not apply to the dispensing of physicians prescriptions or of medicinal and chemical preparations sold in original packages. Any person failing to comply with the requirements of this section shall be liable to a penalty of five dollars for each and every such offense.

SEC. 14. Any person who shall willfully make any false representation to procure registration for himself or any other person, shall for each and every such offense be liable to a penalty of fifty dollars.

SEC. 15. All suits for the recovery of the several penalties prescribed in this act shall be prosecuted in the name of the "People of the State of Illinois" in any court having jurisdiction; and it shall be the duty of the State's attorney of the county where such offense is committed to prosecute all persons violating the provisions of this Act upon proper complaint being made. All penalties collected under the provisions of this Act shall inure to the Board of Pharmacy.

INDIANA.

LAWS PROHIBITING SALE OF LASCIVIOUS ARTICLES AND ABORTIFACIENTS.

CRIMINAL CODE.

SECTION 91. Whoever sells or lends, or offers to sell or lend, or gives away, or offers to give away, or in any manner exhibits or has in his possession, with or without intention to sell, lend or give away, any obscene, lewd, indecent, or lascivious book, pamphlet, paper, drawing, lithograph, engraving, picture, daguerreotype, photograph, stereoscopic picture, model, cast, instrument, or article of indecent or immoral use, or instrument or article for procuring abortion, or for self-pollution, or medicine for procuring abortion or preventing conception, or advertises the same, or any of them, for sale, or writes or prints any letter, circular, handbill, card, book, pamphlet, advertisement or notice of any kind, or gives information orally, stating when, how, where, or by what means, or of whom any of the obscene, lewd, indecent or lascivious articles or things, hereinbefore mentioned,

can be purchased, borrowed, presented or otherwise obtained, or are manufactured, or manufactures, or draws and exposes, or draws with intent to sell, or have sold, or prints any such articles or things, shall be fined not more than five hundred dollars nor less than ten dollars, to which may be added imprisonment in the county jail for not more than six months nor less than ten days; but nothing in this section or the next two sections shall be construed to effect teaching in regularly chartered medical colleges, or the publication of standard medical books, or the practice of regular practitioners, of medicine or druggists in their legitimate business.

SEC. 92. Whoever deposits in any post-office in this State, or places in charge of any person to be carried or conveyed, any lewd, obscene, indecent or lascivious book, paper, pamphlet, drawing, lithograph, engraving, picture, daguerreotype, photograph, stereoscopic picture, model, cast, instrument or article of indecent or immoral use, or instrument or article for procuring abortion, or for self-pollution, or medicine for procuring abortion or preventing conception, or any circular, handbill, card, advertisement, book, pamphlet, or notice of any kind, or gives oral information stating when, where, how or of whom, such articles or things or any of them can be purchased, or otherwise obtained, or knowingly receives the same, or any of them with intent to carry or convey the same, or knowingly carries or conveys the same, except in the United States mail, shall be fined not more than five hundred dollars nor less than five dollars, to which may be added imprisonment in the county jail not more than six months nor less than ten days.

SEC. 93. Whoever prints or publishes any advertisements of any secret drug or nostrum, purporting to be for the exclusive use of females, and which cautions females against their use when in a condition of pregnancy, or in any way publishes any account or description of any drug, medicine, instrument or apparatus for preventing conception, or for procuring abortion or miscarriage, or sells or gives away, or keeps for sale or gratuitous distribution any newspaper, circular, pamphlet, or book containing such advertisement, account or description, of any secret drug or nostrum purporting to be exclusively for the use of females, or for preventing conception, or procuring abortion or miscarriage, shall be fined not more than five hundred dollars nor less than five dollars, to which may be added imprisonment in the county jail, not more than six months nor less than ten days.

IOWA.

REGULATION NO. 25—AS AMENDED. ADOPTED MAY 1, 1894.

Applicants for registration by examination will be deemed "competent and fully qualified," as provided in Section 5, Chapter 75, Laws of 1880, and entitled to certificate as Registered Pharmacist, when fully twenty-one years of age, when having had at least two years' practical experience in a drug store or pharmacy, provided that the actual time spent in a recognized College of Pharmacy will be considered as practical experience, but not more than one year of such time will be allowed; or, if a graduate of a recognized medical school, at least three years in the actual practice of medicine, and when upon examination they shall give still further satisfactory evidence of fitness.

Applicants for registration under twenty-one years, but not less than eighteen years of age, having had a practical experience of at least two years in a drug store or pharmacy, or college as above specified, and who have, upon examination, given satisfactory evidence of qualification, will be registered as Assistant Pharmacist, and certificates issued accordingly; and said certificates of assistant pharmacist will, upon application, be exchanged for certificates of regular registration, when the holder thereof shall have arrived at the age of twenty-one years.

J. H. PICKETT,
FLETCHER HOWARD,
W. L. LELAND,
Commissioners.

Adopted May 1, 1894.

TIMES AND PLACES FOR EXAMINATION—REGULATION NO. 8. AS AMENDED MAY 1, 1894.

Examinations will be conducted at Des Moines, Oskaloosa, Hawarden and Sheldon, on the first Tuesday of each month.

Blank applications can be obtained of either Commissioner or the Secretary, and should be filed with the Commissioner or Secretary, before whom the applicant will appear, in advance of examination day.

Adopted May 1, 1894.

MAINE.

AN ACT TO PREVENT INCOMPETENT PERSONS FROM CONDUCTING THE BUSINESS OF APOTHECARIES.

CHAPTER 379.

Be it enacted by the Senate and House of Representatives in Legislature assembled, as follows:

SECTION 1. From and after the passage of this Act it shall not be lawful for any person, within the limits of the State, to conduct the business of an apothecary, or any part thereof, except as hereinafter provided.

SEC. 2. The Governor, under the advice and consent of the Council, shall appoint three suitable persons to be Commissioners of Pharmacy, one Commissioner to be appointed as the term of each of those now holding office shall expire, to hold office for the term of three years, unless removed for cause, and until a successor is appointed and qualified. If a vacancy occurs in said commission another shall be appointed as aforesaid to fill the unexpired term thereof. Before entering on the duties of their office the Commissioners shall be sworn to faithfully and impartially discharge the same, and a record shall be made thereof on their commission. Said Commissioners shall make a report of their proceedings annually to the Governor and Council, who shall cause such a number of said reports to be printed as they deem necessary.

SEC. 3. Said Commissioners shall examine any person who desires to carry on the business of an apothecary, and if he is found skilled in pharmacy, shall give him a certificate of that fact, and that he is authorized to engage in the business of an apothecary, and such certificate must be signed by at least two Commissioners. They shall register in a suitable book, to be kept in the office of the Secretary of State, the name and place of residence of all to whom they issue certificates and the date thereof.

SEC. 4. Every person not now registered, unless he was engaged in the business of apothecary, in the State of Maine, on the eleventh day of March, in the year of our Lord eighteen hundred and seventy-seven, continuing in or hereafter entering on the business of an apothecary, shall be examined by said Commissioners, and shall present to them satisfactory evidence that he has been an apprentice, or employed in an apothecary store where physicians' prescriptions are compounded, at least three years; or has graduated from some regularly incorporated medical college or college of pharmacy, and is competent for the business; and the commissioners may then grant him a certificate and registry as hereinbefore provided; but only one of the partners in a firm need be a registered druggist, provided, the partner who compounds medicines be registered. And any physician who has a diploma as a graduate of a duly established medical college in the United States, and in active practice, may do the business of an apothecary without being registered.

SEC. 5. For each examination under the provisions of this Act, the Commissioners shall be entitled to receive from the person examined ten dollars, except as hereinafter provided, which shall be in full for all services and expenses. In case the result of the examination is unsatisfactory, and no certificate is granted, the applicant shall have the

right to another examination without charge after an interval of two months, and within twelve months after the date of his first examination.

SEC. 6. Certificates of two grades or kinds may be issued, whereof one shall declare that the holder is skilled in pharmacy, as in Section 4 of this Act, and the other kind which, after the examination of the applicants thereof, may be issued to such as shall be not less than eighteen years of age, and who have served two full years in an apothecary store where physicians' prescriptions are compounded, shall declare that the holder is a qualified assistant, and is competent to take charge of the business of an apothecary during the temporary absence of the registered apothecary, and the fee for such assistant's examination shall be five dollars.

SEC. 7. It shall not be lawful for any apothecary store to be kept open for the sale of medicines or poisons, or for compounding physicians' prescriptions, nor shall such drugs or medicines be exposed or displayed for sale in any such store, unless the same is placed and kept under the personal control and supervision of a registered apothecary or qualified assistant, but such store may be under the charge of a qualified assistant during the temporary absence of such registered apothecary.

SEC. 8. Any person engaged in the business of apothecary, in the State of Maine, on the eleventh day of March, in the year of our Lord one thousand eight hundred and seventy-seven, may receive a certificate and be registered as aforesaid on application to said Commissioners, with proof of his competency.

SEC. 9. If any person who was not engaged in the business of an apothecary within the State of Maine on the eleventh day of March, in the year of our Lord one thousand eight hundred and seventy-seven, shall hereafter engage in or be found in charge of or carrying on the business of an apothecary contrary to provisions of this Act, he shall, upon indictment and conviction, be subject to a penalty of fifty dollars per month for the first offence, and one hundred dollars per month for each and every subsequent offence, whether for continuance in said business or for engaging anew therein in violation of the provisions of this Act. It is hereby made the duty of the county attorney in each county, upon complaint made by any one of said Commissioners, to prosecute all violations of the provisions of this act. The Treasurer of each county shall pay to the Treasurer of the Law Library Association of his county, for the use and benefit of the county Law Library, twenty per cent. of all fines actually paid into the county treasury for the violation of any of the provisions of this Act.

SEC. 10. The provisions of this Act shall apply in the cases of women who shall hereafter enter upon and carry on the business of apothecaries.

SEC. 11. This Act shall not apply in the case of physicians who prepare and dispense their own medicines, nor to the sale of proprietary preparations.

SEC. 12. All Acts and parts of Acts inconsistent with this Act are hereby repealed.

SEC. 13. Any person may enter upon the business of an apothecary without the certificate required by the foregoing Act; provided he does not personally do the duties of an apothecary, but employs a duly registered apothecary, who has sole charge of compounding, putting up and dispensing medicines and drugs under the provisions of this Act.

SEC. 14. No action now pending by virtue of Section six of Chapter twenty-eight of the Revised Statutes shall be maintained except as to costs, or shall hereafter be commenced for any penalty or forfeiture incurred prior to the approval of this Act.

SEC. 15. The word apothecary as used in this Act shall not include persons who do not compound medicines, put up prescriptions or sell poisons.

SEC. 16. This Act shall take effect when approved.

[As amended by Act approved March 25, 1893.]

MINNESOTA.

New Penal Code. (As Amended 1891.)

Section 326. *Apothecary Omitting to Label Drugs, or Labeling Them Wrongly.*—An apothecary or druggist, or a person employed as clerk or salesman by an apothecary or druggist, or otherwise carrying on business as a dealer in drugs or medicines, who, in putting up any drugs or medicines, or making up any prescription, or filling any order for drugs or medicines, wilfully, negligently or ignorantly omits to label the same, or puts any untrue label, stamp or other designation of contents upon any box, bottle or other package containing a drug or medicine, or substitutes a different article for any article prescribed or ordered, or puts up a greater or less quantity of any article than that prescribed or ordered, or otherwise deviates from the terms of the prescription or order which he undertakes to follow, in consequence of which human life or health is endangered, is guilty of a misdemeanor.

Sec. 327. *Apothecary Selling Poison Without Recording the Sale.*—An apothecary or druggist, or a person employed as clerk or salesman by an apothecary or druggist, or any person otherwise carrying on business, who shall sell, or give away arsenic, or its preparations, aconite, belladonna, lead or its preparations, mercury or its preparations, hydrocyanic acid, oxalic acid, copper or its preparations, phosphorus, oil of savin, oil of tansy, morphine, strychnine, laudanum, Rough on Rats, or cyanide of potassium, without first recording in a book to be kept for that purpose, the name and residence of the person receiving such poison, together with the kind and quantity of such poison received, except upon the written order or prescription of some practicing physician, is guilty of a misdemeanor. Any person purchasing any of the above-named drugs, who shall give the person selling the same a false name for registration, shall, upon conviction thereof, be deemed guilty of a misdemeanor. Provided, that this section shall not apply to the sale of Paris green.

Sec. 328. *Refusing to Exhibit Record.*—A person whose duty it is by the last section to keep a book for recording the sale or gift of poisons, who wilfully refuses to permit any officer or person acting under the direction of an officer, to inspect said book upon reasonable demand during ordinary business hours, shall, upon conviction thereof, be deemed guilty of a misdemeanor, and be punished by a fine not to exceed fifty dollars.

Sec. 329. *Selling Poison without Label.*—An apothecary or druggist, or a person employed as clerk or salesman by an apothecary or druggist, or any person otherwise carrying on business, who shall sell or give away arsenic or its preparations, aconite, belladonna, lead or its preparations, mercury or its preparations, hydrocyanic acid, oxalic acid, copper or its preparations, morphine, phosphorus, oil of savin, oil of tansy, oil of cedar, strychnine, Rough on Rats, cyanide of potassium, carbolic acid, tincture of nux vomica, fluid extract ergot, fluid extract cotton root, chloroform, chloral hydrate, croton oil, sulphate of zinc, mineral acids, stramonium, conium, opium or its preparations, except paregoric and Dewees' carminative, without attaching to the vial, box or parcel containing such substance, a label with the name and residence of such person, the word "poison," and the name of such article written or printed, or partly written and partly printed thereon, in plain and legible characters, is guilty of a misdemeanor.

Provided, that the provisions of this section shall not apply when the sale is made upon the written prescription or order of some practicing physician.

Sec. 330. *Medical Prescriptions.*—No person employed in a drug store or apothecary shop shall prepare a medical prescription unless he has served two years' apprenticeship in such store or shop, or is graduate of a medical college or college of pharmacy, except under the direct supervision of some person possessing one of those qualifications; nor shall any proprietor or other person in charge of such a store or shop permit any person not possessing such qualifications to prepare a medical prescription in his store or shop,

except under such supervision. A person violating any provisions of this section is guilty of a misdemeanor, punishable by a fine not exceeding one hundred dollars, or by imprisonment in the county jail not exceeding six months; and in case of death ensuing from such violation, the person offending is guilty of a felony, punishable by a fine not less than one thousand dollars nor more than five thousand dollars, or by imprisonment in the state prison not less than two years nor more than four years, or by both such fine and imprisonment.

MISSOURI.

Chapter 58 Revised Statutes of 1889.

Section 4625 *a*. The said Board of Pharmacy shall, upon application, and at such time and place and in such manner as they may determine, examine every person who shall desire to conduct the business of selling at retail, compounding or dispensing drugs, medicines or chemicals for medicinal use, or to compound and dispense physicians' prescriptions as pharmacist, and if the majority of said board shall be satisfied that such person is competent and fully qualified to conduct said business, they shall enter the name of such person as a registered pharmacist in the book provided for in Section 4613, of Chapter 58 of the Revised Statutes of Missouri, 1889. *Provided*, That the Board of Pharmacy in conducting examinations under the provisions of this Section, shall not be permitted to inquire into the *source of information of any applicant, but shall subject all applicants to the same examination, and require of all the same degree of efficiency. Provided*, That nothing herein shall affect the rights of those who are now legally registered pharmacists.

Sec. 2. All acts or parts of acts inconsistent with this act are hereby repealed. (Amendment. See Laws 1894.)

MONTANA.

An Act Regulating the Practice of Pharmacy and the Sale of Medicines and Poisons. House Bill No. 29.

Be it Enacted by the Legislative Assembly of the State of Montana:

Section 1. That it shall hereafter be unlawful for any person other than a registered pharmacist, as hereinafter defined, to retail, compound or dispense drugs, medicines or pharmacal preparations, in the State of Montana; or to institute, conduct or manage a pharmacy, store or shop for the retailing, compounding or dispensing drugs, medicines or pharmacal preparations, in the State of Montana, unless such person shall be a registered pharmacist, as this Act provides, or shall place in charge of said pharmacy, store or shop, a registered pharmacist, except as hereinafter provided.

Sec. 2. "Registered Pharmacists" shall comprise all persons who shall within three months after the passage of this Act, forward to the State Board of Pharmacy satisfactory proof, supported by their affidavit, that they are practical pharmacists, or engaged in the business of retail pharmacists in the State of Montana on their own account, at the time of the passage of this Act, and who shall then, upon the payment of a fee of five dollars, be granted a certificate of registration; provided, that in case of failure or neglect to register as herein specified, then such person shall, in order to obtain a registration, pass a satisfactory examination as to his competency before the State Board of Pharmacy; *and all persons over twenty-one years of age, having four years' practical experience in compounding and dispensing of physicians' prescriptions, who shall pass a satisfactory examination before the State Board of Pharmacy;* provided, however, that such persons over twenty-one years of age, having had four years' practical experience in compounding and dispensing of physicians' prescriptions, who may be or ever have been engaged

in said business either as proprietor or employee, and residents of Montana at the date of the passage of this Act, may become registered pharmacists upon furnishing satisfactory proof of such fact to the board and the payment of a fee of five dollars; *graduates in pharmacy who have obtained diplomas from such colleges and schools of pharmacy as shall be approved by the Board of Pharmacy, and who, having had two years' experience in the dispensing of physicians' prescriptions, shall, on payment of a fee of five dollars, be made a registered pharmacist.*

SEC. 3. "*Assistant Pharmacists*," in the meaning of this Act, shall comprise all persons over eighteen years of age, *having one year's practical experience in the compounding and dispensing of physicians' prescriptions, who shall pass such examination as the State Board of Pharmacy shall require, and pay a fee of one dollar*, provided, however, that all persons over eighteen years of age who have *had three years' practical experience* in compounding and dispensing of physicians' prescriptions within the State of Montana *prior to* the passage of this Act, may become assistant pharmacists upon furnishing satisfactory proof of such fact to the Board and the payment of a fee of three dollars.

Assistant pharmacists shall not be permitted to conduct or manage on their own account any pharmacy, nor assume the management of such business for others.

SEC. 4. Immediately upon the passage of this Act, the Montana Pharmacal Association may submit to the Governor of the State of Montana the names of ten registered pharmacists, having at least ten years' practical experience as dispensing pharmacists; provided, however, that nothing herein contained shall be so construed as to *apply to or exclude registered pharmacists of less than ten (10) years' practical experience, who are graduates in pharmacy*, and from this number the Governor shall appoint three, *at least one of whom shall be a graduate in pharmacy*, and the said three registered pharmacists shall constitute the State Board of Pharmacy of the State of Montana, to have and hold office for the term of one, two and three years respectively, as designated in their appointments, or until their successors have been duly appointed and qualified.

Annually thereafter the Montana Pharmacal Association may elect five (5) registered pharmacists, having ten years' practical experience as dispensing pharmacists; provided, however, that nothing herein contained shall be so construed as to apply to or exclude registered pharmacists of less than ten (10) years' practical experience who are graduates in pharmacy. And the Governor shall appoint one registered pharmacist from this number to fill the vacancy annually occurring on the board. The term of office shall be three years, or until a successor is appointed and qualified. In case of resignation or removal from the State of any member of the said board, or a vacancy occurring from any cause, the Governor shall immediately appoint from the remaining selections of the Montana State Pharmacal Association a registered pharmacist to serve as a member of the Board for the remainder of the unexpired term. Provided, however, that said board *shall always contain at least one graduate in pharmacy.*

SEC. 5. The said board shall, within thirty days after its appointment, meet in the city of Helena, and organize by the selection of a president, secretary and treasurer, who shall serve for the term of one year, and who shall perform the duties prescribed by the board. Meetings for the examination of applicants for registration, granting of certificates, and the transaction of such other necessary business, shall be held not to exceed twice in any one year, and at such times and places as may be fixed by the board; provided, that thirty days' notice of the time and place of each meeting at which there is an examination of candidates for registration, shall be given.

It shall be the duty of the board to receive all applications for examination and registration, submitted in proper form, to grant certificates to such persons as may be entitled to the same under this act; to cause the prosecution of all persons violating any of the provisions of this act; to report annually to the Governor and to the State Pharmacal Association upon the condition of pharmacy in the State of Montana, which report shall

furnish also a record of the proceedings of the board, as well as the names of all persons registered under this act; to keep a book for registration, in which shall be entered the names and places of business of all persons registered under this act; on what grounds and under what particular section of this act each was registered, and any other facts pertaining to the granting of certificates.

The said board shall have power to make by-laws for the full and proper execution of its duties under this act; to prescribe the forms and methods of application, examination and registration; to demand and receive from applicants the fees herein provided, which shall be held by the board and applied to the payment of salaries and other necessary expenses incident to the full discharge of its duties.

SEC. 6. The salaries of said board shall be $5.00 to each member for each day of actual service and all legitimate expenses incurred in the discharge of official duties.

The secretary of said board shall receive an additional salary to be fixed by the board, and not to exceed $150.00 per annum; he shall pay to the treasurer at each regular meeting, or whenever the board may direct, such funds of the board as may be in his possession, and take the treasurer's receipt therefor; provided, that no salaries or expenses of the board shall be paid out of the State Treasury.

In its annual report to the Governor and the Montana State Pharmacal Association, the board shall render an account of all moneys received and disbursed, pursuant to this act; and the secretary and treasurer shall give such bonds as such board shall from time to time direct.

SEC. 7. Every person seeking registration under this act, whose registration is not otherwise provided for, shall make application, in form and manner prescribed by the board, and deposit with the Secretary of the Board, a fee of $5.00: then, on presenting himself at the time and place directed by the board, and sustaining a satisfactory examination, he shall be granted an appropriate certificate setting forth his particular qualifications; provided, that in case of failure of an applicant to pass a satisfactory examination, he will be entitled to a second examination without charge, at the next succeeding meeting of the board.

SEC. 8. Every registered pharmacist, and every assistant pharmacist, in the meaning of this act, who desires to continue in the pursuit of pharmacy, in this State, shall annually, after the expiration of the first year of registration, and on or before the second day of July of each year, and after having been notified by the Secretary of the State Board of Pharmacy, pay to the Secretary of the Board of Pharmacy *a renewal fee*, to be fixed by the board, which shall *not exceed $2.00*, in return for which a renewal of registration shall be issued. If any person *shall fail or neglect to procure his annual registration* as herein specified, notice of such failure having been mailed to his post-office address, by the Secretary of the State Board of Pharmacy, as obtained from the books of the secretary, he shall, after *the expiration of thirty days following* the issue of said notice, *be deprived of all privileges conferred by this act*, and *after six months he shall be deprived of his registration*. It shall be necessary for such person to make application and pass examination as provided in Section 7 of this act.

SEC. 9. Every person registered under this act shall receive from the State Board of Pharmacy an appropriate certificate, not exceeding in size 320 square inches, which shall be *conspicuously displayed* at all times in his place of business.

If the holder be entitled to manage or conduct a pharmacy in this State for himself or another, the fact shall be set forth in the certificate.

SEC. 10. Any person who is not a registered pharmacist in the meaning of this act, who shall keep a pharmacy, store or shop for the compounding and dispensing of physicians' prescriptions, or for the sale of drugs, medicines, or chemicals, and who shall not have in his employ in said pharmacy, store or shop, a registered pharmacist, in the meaning of this act, shall for each and every such offense be liable to a fine of $250.

SEC. 11. Any person who shall unlawfully and without authority under this act, take, use or exhibit the title of registered pharmacist or assistant pharmacist in the State of Montana, shall be liable to a fine of $100 for each and every offence; a like penalty shall attach to any assistant pharmacist who shall, without authority, take, use or exhibit the title of registered pharmacist in the State of Montana.

SEC. 12. Any proprietor of a pharmacy, or other person, who shall permit the compounding and dispensing of physicians' prescriptions, or the vending of drugs, medicines or pharmacal preparations, in his store or place of business, except by a registered pharmacist, in the meaning of this act, or under the immediate supervision of a registered pharmacist, or who, while continuing in the pursuit of pharmacy in the State of Montana, shall fail or neglect to procure his annual registration, or any person who shall wilfully make any false representations to procure for himself, or for another, registration under this act, or who shall violate any other provision of this act, shall, for each and every offence, be liable to a fine of $100; *Provided*, that nothing in this act shall interfere with the business of those merchants *who keep on sale such poisons, acids and chemicals as are regularly used in agriculture. mining and the arts, when kept and sold for such purposes only, in sealed and plainly labeled packages; provided*, also, that nothing in this act shall in any manner *interfere with the business of any physician in regular practice, nor prevent him from supplying to his patients such articles as may seem proper, nor with exclusive wholesale business of any dealers, except as hereinafter provided; provided*, also, that nothing in this act shall in any manner interfere with the business of merchants in towns having *less than 500 inhabitants, in which there is no licensed pharmacy, to sell or vend such medicines, compounds and chemicals as are* required by the general public.

SEC. 13. The proprietors of all pharmacies shall be held responsible for the quality of all drugs and medicines and chemicals sold or dispensed at their respective places of business except patent and proprietary preparations, and articles sold in the original packages of the manufacturer. Any person who shall willfully adulterate or alter, or cause or permit to be adulterated or altered, any drug, medicine, or pharmaceutical preparation, or shall sell or offer for sale any such adulterated or altered article, or any person who shall substitute, or cause to be substituted, one material for another, with the intention to defraud or deceive the purchaser, shall be guilty of a misdemeanor, and liable to prosecution therefor. All penalties collected for such violation shall be paid into the county treasury of the county wherein such conviction may be had, for the benefit of the school fund of such county.

SEC. 14. Annually, on the first day of July of each year, the State Board of Pharmacy shall pay into the treasury of the State all moneys then held by said Board, over and above the sum of $300, and which have been received by said Board as registration fees for the expiring year.

SEC. 15. It shall be unlawful for any person from and after the passage of this *Act to retail any* of the following named poisons, to wit: Arsenic and its preparation, corrosive sublimate, white and red precipitate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnine, and all poisonous vegetable alkaloids and their salts, the essential oil of almonds, opium and its preparations, except paregoric and other preparations of opium conlaining less than two grains to the ounce, aconite, belladonna, colchicum, conium, nux vomica, digitalis and their pharmaceutical preparations, croton oil, chloroform, chloral hydrate, sulphate of zinc, mineral acids, carbolic acid, oxalic acid, *without labeling the box, bottle, vessel, paper or package in which said poison is contained, with the name of the article, the word "Poison," and the name and place of business of the seller*. Nor shall it be lawful for any person to deliver or sell any poisons enumerated above, unless upon due inquiry it be found that the purchaser is aware of its poisonous character, and represents that it is to be used for a legitimate purpose. The provisions

of this section shall not apply to the dispensing of poisons in not unusual quantities or dose upon the prescription of practitioners of medicine. Any person or persons violating the provisions of this section shall be deemed guilty of a misdemeanor; provided, however, that this section shall not apply to manufacturers making and selling at wholesale any of the above poisons, and provided that each bottle, box, vessel, paper or package in which said poison is contained shall be labeled with the name of the article, the word "Poison," and the name and place of business of the seller.

SEC. 16. *Any itinerant vender* of any drug, poison, ointment or appliance of any kind intended for treatment of any disease or injury, who shall, by writing or printing, or any other method, publicly profess to cure or treat disease or injury, or deformity, by any drug, nostrum or manipulation or other expedient, shall pay a license of $50 per annum in each county in which he may offer to do business, or according to the usual laws in force for that purpose.

SEC. 17. Section four hundred and fifteen (415) of the penal code of the state of Montana, together with all laws and parts of laws contrary to or in conflict with this act, are hereby repealed.

SEC. 18. This act shall take effect and be in force from and after its passage.

Approved 2:30 p. m., March 9, 1895.

STATE OF MONTANA, Secretary's Office, *ss.:*

I, L. Rotwitt, Secretary of the State of Montana, do hereby certify that the above is, with the exception of corrections in orthography and punctuation, and insertion of omissions or substitute words in brackets, a true and correct copy of "An Act Regulating the Practice of Pharmacy and the Sale of Medicines and Poisons," enacted by the Fourth Session of the Legislative Assembly of the State of Montana, and approved by J. E. Rickards, Governor of said State, on the ninth day of March, 1895.

In testimony whereof, I have hereunto set my hand and affixed the Great Seal of said State. Done at the City of Helena, the Capital of said State, this tenth day of April, A. D. 1895.

[L. S.] L. ROTWITT, *Secretary of State.*

NEBRASKA.

CHAPTER VI. OF THE CRIMINAL CODE OF NEBRASKA.

SECTION 42. Every apothecary, druggist, or other person, who shall sell or give away, except upon the prescription of a physician, any article or articles of medicine belonging to the class usually known as poisons, shall be required: *First.* To register in a book kept for that purpose the name, age, sex and color of the person obtaining such poison. *Second.* The quantity sold. *Third.* The purpose for which it was required. *Fourth.* The day and date on which it was obtained. *Fifth.* The name and place of abode of the person for whom the article is intended. *Sixth.* To carefully mark the word poison upon the label or wrapper of each package. *Seventh.* To neither sell or give away any article of poison to minors of either sex.

SEC. 43. No apothecary, druggist, or other person shall be permitted to sell or give away any quantity of arsenic less than a pound without first mixing either soot or indigo therewith in the proportion of one ounce of soot or one-half an ounce of indigo to the pound of arsenic.

SEC. 44. Any person offending against the provisions of either of the last two preceding sections shall be fined in any sum not less than twenty nor more than one hundred dollars.

NEW JERSEY.

An Act to Amend an Act Entitled "An Act to Regulate the Practice of Pharmacy in the State of New Jersey," Approved April 5, 1886.

1. *Be it enacted by the Senate and General Assembly of the State of New Jersey*, That the act entitled "An act to regulate the practice of pharmacy in the State of New Jersey," approved April fifth, one thousand eight hundred and eighty-six, be amended so as to read as follows:

1. *Be it enacted by the Senate and General Assembly of the State of New Jersey*, That from and after the passage of this act it shall not be lawful for any person not a registered pharmacist, within the meaning of this act, to conduct any store or pharmacy for retailing, dispensing or compounding drugs, medicines or poisons, or for any one not a registered pharmacist or qualified assistant to prepare and dispense physicians' prescriptions, or to retail or dispense medicines or poisons, except under the immediate supervision of a registered pharmacist.

2. *And be it enacted*, That on or before the first day of June next, the New Jersey Pharmaceutical Association shall submit to the Governor the names of fifteen pharmacists doing business within this State, from which number the Governor shall appoint five persons, who shall constitute the Board of Pharmacy of the State of New Jersey, and who shall hold office for the term of one, two, three, four and five years, as designated in their respective appointments, and until their successors shall have been appointed and qualified; the New Jersey Pharmaceutical Association shall annually thereafter nominate to the Governor five pharmacists, of whom the Governor shall appoint one to fill the vacancy annually occurring in the said board, who shall hold office for five years and until his successor shall have been appointed and qualified; any vacancy occurring in said board shall be filled by the Governor for the unexpired term from among the persons last nominated to him; each person so appointed shall, within thirty days after appointment, take and subscribe an oath, before any officer authorized to administer oaths in the State, that he will faithfully discharge the duties prescribed by this act.

3. *And be it enacted*, That the Board of Pharmacy shall organize by electing a president, a secretary and a treasurer, and shall have power to make by-laws and rules for the proper fulfillment of its duties under this act; it shall meet on the third Thursday of January, April, July and October in the city of Trenton, and at such other places and dates as may be required; it shall examine into all applications for registration and grant certificates of registration to all persons whom it shall judge, on examination, to be properly qualified to practice pharmacy; it shall keep a book of registration, in which shall be entered the names and places of business of all persons registered under this act, and shall also keep a book of record of all its official transactions, which book shall be legal evidence of such transactions in any court of law; it shall have power to examine into all cases of alleged abuse, fraud and incompetence, cause the prosecution of all persons not complying with the provisions of this act, and suspend and revoke the registration of any person legally convicted of violating the same, or of any person addicted to chronic and persistent inebriety, or of any person convicted of a crime involving moral turpitude; it shall annually report to the Governor and to the President of the New Jersey Pharmaceutical Association upon the condition of pharmacy in the State, which report shall embrace a detailed statement of the receipts and expenditures of the board; the members of such board shall receive the sum of five dollars for each day actually engaged in this service, to be paid from the fees and penalties collected under this act, and all moneys thus collected by said board in excess of said per diem allowance and of the necessary expenses of said board, shall be paid to the treasurer of the New Jersey Pharmaceutical Association at its annual meeting; three members of the board shall constitute a quorum.

4. *And be it enacted*, That every person applying for registration as pharmacist under

this act shall not be less than twenty-one years of age, and shall furnish satisfactory evidence that he has had at least four years' experience in the practice of pharmacy, and pay to the secretary of the Board of Pharmacy a fee of ten dollars, and upon passing an examination satisfactory to said board, he shall receive from said board a certificate of registration; in case of failure to pass a satisfactory examination, the applicant shall be granted a second examination (without the payment of another fee) at any time within one year from his first examination; and that the Board of Pharmacy shall grant an assistant's certificate to any person not less than eighteen years of age, who shall have had three years' practical experience in pharmacies where prescriptions have been usually compounded, and shall have passed a satisfactory examination before said Board of Pharmacy; which certificate shall entitle such person to all the privileges of a registered pharmacist during the temporary absence of his employer, and shall not entitle such assistant to engage in business on his own account or as manager to conduct a pharmacy; every person applying for an assistant's certificate shall pay to the Secretary of the Board of Pharmacy a fee of five dollars before examination; in case of failure to pass a satisfactory examination the applicant shall be granted a second examination without the payment of another fee at any time within one year from his first examination; every pharmacist owning or conducting a pharmacy or store shall conspicuously display his certificate of registration in said pharmacy or store, and any failure to do so shall be prima facie evidence that such person is not a registered pharmacist; and every registered pharmacist and every registered assistant who desires to continue the practice of his profession shall once in three years during the time he shall continue such practice on such date as the Board of Pharmacy shall prescribe, pay to the secretary of the board a registration renewal fee of fifty cents, in return for which he shall receive a renewal of his registration.

5. *And be it enacted*, That any person who shall procure or attempt to procure registration for himself or any other person under this act, by making or causing to be made any false representation or fraudulently represent himself to be registered, or shall adulterate or sell any adulterated drug, medicine or chemical, or who shall otherwise violate the provisions of this act (except section six), shall be deemed guilty of a misdemeanor, and, upon conviction thereof, be liable to a penalty of not less than fifty or more than one hundred dollars, and for every subsequent offense or offenses a like fine or imprisonment, not to exceed six months, or both, at the discretion of the court.

6. *And be it enacted*, That it shall not be lawful for any person to retail or dispense any of the poisons enumerated in Schedule A appended to this section or any other substance commonly recognized as a deadly poison, without distinctly labeling with a red label the bottle, box, vessel or wrapper in which such poison is contained, with the name of the article, the word "poison" and the name and place of business of the dispenser, nor without being satisfied that the purchaser is aware of its poisonous nature and intends to use it for a legitimate purpose; any person failing to comply with the requirements of this section shall be deemed guilty of a misdemeanor, and for every such omission shall be liable to a fine of not less than ten dollars; and any person who shall give a fictitious name, or who shall make any false representations to the seller when buying any of the poisons thus enumerated, shall be deemed guilty of a misdemeanor and be liable to a fine of not less than ten dollars; the penal provisions of this act shall not apply to the sale of such poisons as are used in the arts, agriculture or in manufacturing, to persons known to be engaged in such pursuits, nor to the dispensing of poisons upon the prescription of a practicing physician.

SCHEDULE A.

Arsenic and its compounds or chemical derivatives; corrosive sublimate and other poisonous derivatives of mercury; phosphorus and its poisonous derivatives; prussic

acid and its poisonous derivatives; tartrate of antimony; essential oil of bitter almonds; oils of tansy, savin or croton; chloroform, chloral hydrate, aconite, belladonna, conium, cantharides, digitalis, hyoscyamus, nux vomica, Indian hemp, veratrum, viride, yellow jessamine, opium, their alkaloids or other preparations (except paregoric and other preparations of opium having less than two grains to the ounce); ergot, savin, cotton-root and their preparations.

7. *And be it enacted*, That any person or persons who shall establish or conduct any pharmacy for the retailing, dispensing or compounding of drugs, medicines, physicians' prescriptions or poisons, not being a duly registered pharmacist of this State, or shall be engaged as clerk or assistant in said store or pharmacy, and retailing, dispensing or compounding drugs, medicines, poisons or physicians' prescriptions, not having first obtained a certificate of registration as a pharmacist or assistant in accordance with the provisions of this Act; or being a duly registered pharmacist or assistant, shall violate any of the provisions of the next preceding section, or shall adulterate or sell any adulterated drug, medicine or chemical; or any person who shall procure, or attempt to procure, registration for himself or any other person under this Act, by making or causing to be made any false representations, or fraudulently represents himself to be registered in accordance with the provisions of this Act, shall forfeit and pay such sum, not to exceed one hundred dollars, together with costs, as the court shall determine, to be sued for and recovered in an action of debt, with costs of suit, by any person or persons, in the name of the Board of Pharmacy of the State of New Jersey, before any justice of the peace, district court or police magistrate in the county where the offense or offenses were committed, one-half thereof to the person or persons who shall sue therefor, and one-half to the Board of Pharmacy of the State of New Jersey.

8. *And be it enacted*, That nothing in this Act shall be construed to apply to or in any manner interfere with the strictly professional pursuits of any physician, nor with the making or vending of *non-poisonous patent* or proprietary medicines, nor with the sale of simple *non-poisonous* domestic remedies by retail dealers in rural districts, nor with the ownership of any pharmacy or store in part or whole by any person not a registered pharmacist; *provided*, such pharmacy or store be at all times in charge of a registered pharmacist; and any person holding a certificate of registration granted under any former Act shall be considered a registered pharmacist within the meaning of this Act.

9. *And be it enacted*, That each and every fine imposed under the provisions of this Act shall be paid to the treasurer of the Board of Pharmacy.

10. *And be it enacted*, That this Act shall be a public Act and shall take effect immediately, and that all acts and parts of acts conflicting or inconsistent herewith be and the same are hereby repealed.

Approved the twentieth day of March, one thousand eight hundred and ninety-five.

OREGON.

PHARMACY LAW AS AMENDED.

SECTION 1. That from and after the passage of this act, it shall be unlawful for any person, not a registered pharmacist, within the meaning of this act, to conduct any pharmacy, drugstore, apothecary shop, or store for the purpose of retailing, compounding, or dispensing medicines or poisons, or for the proprietor of any store or pharmacy to allow any person except a registered pharmacist to compound or dispense the prescriptions of physicians, or to retail or dispense poisons for medical use, except as an aid to and under the supervision of a registered pharmacist.

SEC. 2. That within sixty days after the passage of this act, the Governor shall appoint five persons from among competent pharmacists of this state, who shall constitute the Oregon Board of Pharmacy. It shall be the duty of each member of said board, before

entering upon the discharge of his duties, to appear before an officer duly authorized to administer oaths in this State, and make oath to faithfully and impartially discharge the duties of a member of the board. The first term of said members of the Board of Pharmacy shall be one, two, three, four and five years, respectively, and shall be designated by the Governor in his appointments. Members of the board shall meet at such time and place as may be agreed upon, and shall proceed to first elect by ballot a President, Treasurer, and Secretary, who shall hold their offices for the term of one year, or until their successors are elected and qualified. Thereafter, the board shall meet and hold examinations as hereinafter provided at least quarterly during each year, and any three members of the board shall constitute a quorum. The board shall have power to make such By-Laws as it may deem necessary and not inconsistent with the Constitution of this State or with the provisions of this Act, and prescribe the qualifications of a pharmacist of this State. The Governor shall fill vacancy annually occurring in said board, from the competent pharmacists of this State, and the person so appointed shall qualify according to the provisions of this Act, and hold his office as a member of the board for five years. In case of a vacancy occurring in said board from any other cause than expiration of term, the Governor shall also fill such vacancy by appointment, and in the same manner as above, for the unexpired portion of such term.

SEC. 3. That the Secretary of the board shall receive a salary which shall be fixed by the board. He shall also receive his traveling and other expenses incurred in the performance of his official duties. The other members of the board shall receive the sum of five dollars for each day actually engaged in this service, and all legitimate expenses incurred in attending the meetings of said board. Said expenses shall be paid from the fees received by the board under the provisions of this Act. All moneys received in excess of said expenses shall be held by the board as a special fund for meeting further expenses. The board shall render an annual report of the work it has accomplished to the Governor, and render an account of all moneys received and disbursed by them pursuant to this Act.

SEC. 4. That said Board of Pharmacy shall, upon application, and at such time and place and in such manner as they may determine, examine each and every person who shall desire to become registered as a registered pharmacist in this State, and if the majority of said board shall be satisfied that said person possesses the qualifications prescribed by the By-Laws of said Association, they shall issue the proper certificate to such applicant; said certificate to be signed by not less than three members. The Board of Pharmacy shall be entitled to demand and receive of each person whom they examine for registration as a registered pharmacist the sum of five dollars, which shall be in full for all services, and in case the examination of such person shall prove defective and unsatisfactory, and his name not be registered, he shall be permitted to again present himself for examination, and if such examination is had within any period not exceeding twelve months thereafter, no charge shall be made for the same.

SEC. 5. That any person shall be entitled to be registered as a registered pharmacist who shall be either a graduate in pharmacy, a licentiate in pharmacy, or who shall at the time this Act takes effect be engaged in the business of a dispensing pharmacist in the State of Oregon, in the preparation of physicians' prescriptions and in the vending and compunding of drugs, medicines, and poisons.

SEC. 6. That graduates in pharmacy must be such persons as have obtained a satisfactory diploma from a regularly incorporated college or school of pharmacy. Licentiates in pharmacy must be such persons as have passed a satisfactory examination before the State Board of Pharmacy. The said board may grant certificates of registration without further examination to the licentiates of such other boards in pharmacy as it may deem proper.

SEC. 7. Any assistant or clerk in pharmacy, not having the qualifications of a regis-

tered pharmacist within the meaning of this Act, who is of the age of eighteen years, of good moral character, and having had not less than two years' experience in drug stores, where the prescriptions of medical practitioners are compounded, shall be entitled to become registered as a registered assistant upon application to and examination by said Board of Pharmacy upon the payment of a fee of five dollars. Said certificate shall entitle him to continue in such duties as a clerk or assistant, but shall not entitle him to assume the duties of a registered pharmacist unless he shall subsequently become registered as a registered pharmacist, as provided by this Act. Annually thereafter during the time he shall continue in such duties he shall pay to said Secretary the sum of fifty cents, for which he shall receive a renewal of his certificate.

SEC. 8. Every person resident within the State of Oregon, claiming the right of registration under this Act, who shall within three months after the passage of this Act forward to the Board of Pharmacy satisfactory proof, supported by his affidavit, that he was engaged in the business of a dispensing pharmacist within the State of Oregon at the time of the passage of this Act, or is otherwise entitled to registration as provided in this Act, shall, upon the payment of a fee of two dollars, be granted a certificate of registration; *provided, however*, that in case of failure of any such person or persons to apply for the registration within three months after the passage of this Act, and after they shall have been duly notified by said Board of Pharmacy of the State of Oregon, they shall undergo an examination as provided in Section 4 of this Act. Every registered pharmacist, during the time he continues the practice of his profession in this State, shall annually, and on such date as the Board of Pharmacy may determine, pay to the Secretary of said Board the fee of one dollar, in return for which he shall receive a renewal of said registration. Every certificate and every renewal shall be conspicuously exposed in the pharmacy to which it applies.

SEC. 9. That every registered pharmacist, apothecary and owner of any store shall be held responsible for the quality of all drugs, chemicals or poisons he may sell or dispose of, with the exception of those sold in original packages of the manufacturer, and also those known as proprietary and patent medicines, and should he knowingly intermingle and fraudulently adulterate, or cause to be adulterated, or knowingly substitute in a physician's prescription any drugs, chemicals or medical preparations, he shall be deemed guilty of a misdemeanor, and upon conviction thereof be liable to a penalty not exceeding one hundred dollars, and in addition thereto his name shall be stricken from the register.

SEC. 10. That it shall be unlawful for any person, from and after the passage of this Act, to retail any of the following poisons, to wit: Arsenic and its preparations, corrosive sublimate, white precipitate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnine, morphine, cocaine and their combinations, and essential oil of bitter almonds, aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton root, cantharides, creosote, digitalis and their pharmaceutical preparations, croton oil, chloroform, chloral hydrate, sulphate of zinc, carbolic acid, oxalic acid, preparations containing opium, except paregoric and other preparations of opium containing less than two grains to the ounce, and other deadly poisons, without labeling the box, vessel or paper in which said poison is contained with the name of the article, the word "Poison," and the name and place of business of the seller, nor shall it be lawful for any person to deliver or sell such poisons unless upon due inquiry it be found the purchaser is aware of its poisonous character, and represents that it is to be used for legitimate purpose. The proprietor of every drug store shall keep in his place of business a registry book, in which shall be entered an accurate record of the sales of all such poisons. Any violation of this section shall make the owner, manager and principal of said store liable to a fine of not less than ten dollars, and not more than one hundred dollars, for each offence; *provided*, that nothing herein contained shall apply to the dispensing of

physicians' prescriptions of any of the poisons aforesaid, nor to manufacturers making and selling at wholesale any poisons; *but provided*, that each box, vessel or paper in which said poison is contained (except physicians' prescriptions) shall be labeled as above specified.

SEC. 11. Any person not being a registered pharmacist, or who shall not have complied with all the provisions of this Act, who shall take, exhibit or use the title of pharmacist, or who proposes to or does compound or dispense prescriptions of medical practitioners, or retail medicines or poisons to be used as medicines or poisons, or have not in any way followed the provisions of this Act, shall be subject to indictment for each offense, and upon conviction shall be fined for the first offense fifty dollars and the costs of prosecution, and for each subsequent violation he shall be fined one hundred dollars and the costs of the prosecution; *provided*, that nothing in this Act shall be construed to apply to the business of a licensed practitioner of medicines, nor to prevent such practitioner from supplying his patients with such articles as he may deem proper, nor to those who sell medicines or poisons by wholesale only, nor to the manufacture or sale of proprietary or patent medicines. All actions for the recovery of the several penalties prescribed in this Act shall be prosecuted by the district attorney of the proper county in the name of the State of Oregon, upon the relation of himself or any member of the Board; and it shall be his duty to prosecute all persons violating the provisions of this Act, and to sue for all penalties herein provided for, upon proper complaint being made. All penalties collected under the provisions of this Act shall inure one-half to the Board of Pharmacy and the remainder to the county Treasurer for the use of the school fund of the county in which the suit was prosecuted and judgment obtained.

SEC. 12. That any person who shall procure, or attempt to procure, registration for himself or for another under this Act, by making or causing to be made false representations, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be liable to a penalty of not less than twenty-five dollars nor more than one hundred dollars, and the name of the person so falsely registered shall be stricken from the register.

VERMONT.

It is hereby enacted by the General Assembly of the State of Vermont:

SECTION 1. There shall be a State Board of Pharmacy. The board shall consist of five pharmacists, residents of the State, to be appointed by the Governor in the month of November, 1894; one to be appointed for one year, one for two years, one for three years, one for four years, and one for five years. The term of office of each of said members shall commence on the first day of December, 1894; and the Governor shall hereafter, annually, in the month of November, appoint a pharmacist as a member of said board to succeed the member whose term shall expire on December first of that year. The Governor shall also fill all vacancies that may occur in said board.

SEC. 2. Each member of the Board, before entering upon the duties of his office, shall take and subscribe to the following oath: I do solemnly swear (or affirm) that I will perform the duties of a member of the State Board of Pharmacy to the best of my judgment and ability, according to law.

SEC. 3. The members of said board shall annually meet on the first Tuesday of January at the State House, at Montpelier, and shall organize by electing a president, secretary and treasurer. Three members of said board shall constitute a quorum. They shall also meet at least once in three months at some place within the State for the examination of applicants for licenses and certificates. They shall give at least thirty days' notice by mail to all known practicing pharmacists and applicants for license in the State of the place and time of meeting.

SEC. 4. Said board shall have the power to make such by-laws, not inconsistent with

the constitution or the provisions of this Act, as it may deem proper, and to revoke any license for just and sufficient cause.

SEC. 5. It shall be the duty of the State Board of Pharmacy to grant licenses for the practice of pharmacy within the State, which licenses shall be issued to persons twenty-one years of age, who have practiced pharmacy or served an apprenticeship with a pharmacist for the term of three years, and who shall have also passed an examination satisfactory to said board. Said board may also issue certificates upon examination, which shall entitle the holder to act as assistant pharmacist under the direction of a licensed pharmacist.

SEC. 6. Any person twenty-one years of age, who at the time of the passage of this Act is carrying on the business of pharmacy, or shall have served three years or more at the business of retailing or dispensing drugs, or who holds a pharmacist's license from any legally created board of pharmacy, or who is a graduate of a legally incorporated college of pharmacy or of medicine, shall be granted a license on application.

SEC. 7. A person receiving a license under this Act shall, within thirty days from the date thereof, cause the same to be recorded in the office of the Secretary of State, in a book to be provided by said Secretary of the State for that purpose, and shall pay to said Secretary of State, for recording such license, the sum of twenty-five cents.

SEC. 8. Any member of said Board of Pharmacy may issue to any person, whom such member shall find on examination to be entitled to a license under this Act, a temporary license for the practice of pharmacy, which license shall expire at the next meeting of said board.

SEC. 9. Each applicant for a license, under section 6 of this act, shall pay to the treasurer of said board a fee of one dollar, and any person applying for a license or certificate under section 5 of this act, shall pay to said treasurer the sum of five dollars.

SEC. 10. Every person to whom a license is granted by the said Board of Pharmacy shall display the same in a conspicuous part of the pharmacy in which he does business.

SEC. 11. It shall be unlawful after the first day of April in the year 1895, for any person to practice as a pharmacist unless he shall have been granted a license by said board.

SEC. 12. Nothing in this act shall be construed to apply to the business of a practitioner of medicine, nor to prevent practitioners of medicine from supplying their patients with such medicine as they may deem proper. Nor to those who sell medicines or poisons at wholesale only, nor to the manufacture or sale of patent or proprietary medicines; and nothing in this act shall be construed *to apply to the sale of drugs, medicines and poisons by dealers in general merchandise.* Nothing in this act shall *be so construed* as to prohibit the employment in any pharmacy of apprentices or assistants for the purpose of being instructed in the practice of pharmacy; but such apprentices or assistants shall not be permitted to prepare or dispense physicians' prescriptions, nor to sell or furnish poisons, except in the presence of and under the personal supervision of a licensed pharmacist.

SEC. 13. Any person violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by a fine of not less than twenty-five dollars, nor more than fifty dollars, or imprisonment not to exceed six months.

SEC. 14. All sums of money collected for licenses as provided by this act shall be paid to the Treasurer of the State immediately on receipt of same by the treasurer of the board.

SEC. 15. The State Auditor shall audit the accounts of members of the board, and shall allow them three dollars a day for time spent in the discharge of their duties and necessary expenses incurred, provided the amount received for licenses under the provisions of this act shall be sufficient to pay the same; but if the State Auditor shall, at any time, find upon investigation that said sums are not sufficient to meet the per diem and expenses as herein provided, then he shall allow the expenses in full and such per-

centage upon the per diem that the expenses to the State shall not exceed the receipts under the provisions of this act.

SEC. 16. The provisions of this act shall not apply *to the sale of insecticides* nor any *substances for use in the arts.*

SEC. 17. All acts and parts of acts inconsistent herewith are hereby repealed.

SEC. 18. This act shall take effect from its passage.

Bill passed November 24, 1894.

VIRGINIA.

AN ACT TO AMEND AND RE-ENACT SECTIONS 1756, 1757, 1758, 1759, 1760, 1761, 1762, 1763, 1764, 1765 AND 1766 OF CHAPTER 78 OF THE CODE OF VIRGINIA, IN RELATION TO THE PRACTICE OF PHARMACY, AS AMENDED BY AN ACT APPROVED MAY, 6, 1887, ENTITLED AN ACT TO AMEND AND RE-ENACT SECTIONS 6 AND 12 OF AN ACT APPROVED MARCH 3, 1886, ENTITLED AN ACT TO INCORPORATE THE VIRGINIA PHARMACEUTICAL ASSOCIATION, AND TO REGULATE THE PRACTICE OF PHARMACY, AND TO GUARD THE SALE OF POISONS IN THE STATE OF VIRGINIA.

Approved March 9th, 1894.

1. Be it enacted by the General Assembly of Virginia that Sections seventeen hundred and fifty-six, seventeen hundred and fifty-seven, seventeen hundred and fifty-eight, seventeen hundred and fifty-nine, seventeen hundred and sixty, seventeen hundred and sixty-one, seventeen hundred and sixty-two, seventeen hundred and sixty-three, seventeen hundred and sixty-four, seventeen hundred and sixty-five and seventeen hundred and sixty-six of Chapter seventy-eight of the Code of Virginia, as amended by an Act approved May sixth, eighteen hundred and eighty-seven, entitled an Act to amend and re-enact Sections six and twelve of an Act approved March third, eighteen hundred and eighty-six, entitled an Act to incorporate the Virginia Pharmaceutical Association, and to regulate the practice of pharmacy, and to guard the sale of poisons in the State of Virginia, be amended and re-enacted so as to read as follows:

Section 1756. The Board of Pharmacy of the State of Virginia shall be continued. It shall consist of five members, to be appointed by the governor, each for the term of five years. Their term of office shall continue to be arranged so that the term of one of them shall expire each year.

The Virginia Pharmaceutical Association shall annually recommend five registered pharmacists, citizens of the State of Virginia, who shall have had not less than ten years' practical experience in pharmacy, from whom the governor shall select and appoint one to fill the vacancy thus annually occurring in the Board.

In the event of the failure of the said Virginia Pharmaceutical Association to make such recommendation, the governor shall make the said annual appointment in accordance with the other provisions contained in this section.

In case of the death, resignation or removal of any member of the board from the State, the governor shall, from the names submitted to him within one year last past, if such recommendation was made, appoint a pharmacist, in accordance with the provisions and restrictions herein, to serve as a member of the board for the unexpired term. Every person appointed a member of the board shall, before entering upon the duties of the office, take the oath of office in the county or corporation in which he resides, or in which the meeting of the Board next after his term of office begins shall be held, before some officer authorized to administer an oath, and file the certificate of the said oath with the Secretary of the Board.

There shall be a President, a Secretary and a Treasurer of the Board, who shall be selected by the Board from its own members, and the offices of Secretary and Treasurer may be held by the same person.

The President and Secretary and Treasurer shall hold office for the period of one year from their election and qualification, or until their successors are elected and qualified.

The Board shall hold an annual meeting on the third Monday of March of each year, at the city of Richmond, Virginia, and such other meetings, from time to time, as the business of the Board may require, which said additional meetings shall be held at such times and places as the Board may prescribe, of which additional meetings due notice shall be published for ten days prior thereto in four newspapers published in the State.

The Treasurer shall give bond in such penalty as the Board may prescribe for the faithful performance of the duties of his office, with security satisfactory to the Board, and a reasonable charge for each security may be paid by the Board.

The Secretary shall give to each member of the Board at least ten days' notice, in writing, of the time and place of each meeting. Three members shall constitute a quorum.

Section 1757. The Board shall have authority to transact all business relating to the legal practice of pharmacy; to examine into all cases of abuse, fraud, adulteration, substitution or malpractice, and report all violations of the provisions of this chapter to the commonwealth's attorney of the county or corporation in which they occur, who shall investigate and prosecute the same when brought to his attention.

It shall be the duty of the board to examine all persons applying for examination in the proper form, and to register such as shall establish their right to registration, in a-c cordance with the provisions of this chapter. The secretary shall keep a book of registration at his office, in which shall be entered the names and places of business of all persons registered by the board as pharmacists or assistant pharmacists, and the same shall be subject to the inspection of the public on demand.

The secretary shall give receipts for all moneys received by him, which moneys shall be forthwith turned over by him to the treasurer, and shall be used for the purpose of defraying the expenses or disbursements of the board, under the provisions of this chapter; and any surplus in excess of one hundred dollars in the hands of the treasurer on the last day of February of each year shall be turned over to the treasurer of the said Virginia Pharmaceutical Association, to be disposed of by it as it may see fit, so long as said association shall exist.

All expenditures by the board shall be by means of check drawn by the treasurer upon warrants approved by the president.

The salaries of the secretary and treasurer shall be fixed by the board and paid out of the funds of the treasury.

Each member of the board shall receive the sum of five dollars for every day he is actually engaged in the service of the board, and such actual and legitimate expenses as may be incurred in going to and from the place of meeting and remaining thereat during the sessions of the board.

The board shall have power to make such rules and regulations as it may find necessary for carrying into effect the provisions of this chapter, not inconsistent with the provisions and spirit of the same, and with the constitution and laws of the State.

The board shall make an annual report to the governor of its receipts and disbursements for the year, and of its proceedings under and by virtue of the provisions of this chapter.

Section 1758. Every person who desires a certificate of registration as a registered pharmacist, within the meaning and provisions of this chapter, shall produce evidence satisfactory to a majority of the board of his having had not less than four years' practical experience in a chemical or drug store or pharmacy where physicians' prescriptions are compounded, and that he is not less than twenty-one years of age, and shall pay to the treasurer a fee of five dollars, and thereupon the board of pharmacy shall examine such applicant touching his competency and qualification as a pharmacist, and if a majority of the board be satisfied of such competency and qualification, the said board shall

register the name and address of such applicant in the book of registration provided for the purpose, and shall give him a certificate as a registered pharmacist. The foregoing provisions of this section shall apply equally to every applicant for registration as assistant pharmacist, except that he shall be required to produce satisfactory evidence of only two years' practical experience, and that he is not less than eighteen years of age, whereupon, if he passes a satisfactory examination as assistant pharmacist, the said board of pharmacy shall register the name and address of such applicant in the said book of registration, and shall give him a certificate as a registered assistant pharmacist.

In case of the failure of any such applicant to pass a satisfactory examination, as pharmacist or as assistant pharmacist, he shall, if he so desire and demand, be granted a second examination at any regular meeting of the board, without the payment of any further fee therefor; but every person registered as assistant pharmacist shall, before subsequently receiving a certificate as full registered pharmacist, or entering upon his duties as such, within the meaning of this act, subject himself to another examination by the said board of pharmacy, which examination shall be the same as if no certificate as registered assistant pharmacist had been granted him, and no additional fee shall be charged such registered assistant pharmacist for such examination as registered pharmacist.

Section 1759. It shall not be lawful for any person not a registered pharmacist to open or control as proprietor or manager any retail drug or chemical store, or pharmaceutical department thereof, in this state, unless he shall have in his employ and place in charge of such store or pharmacy, or in the pharmaceutical department thereof, a registered pharmacist within the meaning of this chapter, who shall have the supervision and management of that part of the business requiring pharmaceutical skill and knowledge.

And it shall not be lawful for any person to engage in the business or occupation of compounding or dispensing medicines on prescriptions of physicians, or otherwise, or of selling at retail any drugs, chemicals, poisons, or pharmaceutical preparations within this state, without first obtaining a certificate of registry as provided in this chapter; provided nothing in this section shall apply to or in any manner interfere with the regular practice of any physician or veterinary surgeon, or prevent from supplying to his patients such articles as he may deem proper, unless such physician or veterinary surgeon keep open shop for the dispensing of such articles, or with the making or vending of patent or proprietary medicines by any retail dealer in the original packages, or with the manufacture or the exclusive wholesale business of any dealer; and provided, further, that in rural districts and in towns having a population of fifteen hundred or less, any physician recognized by the Medical Society of Virginia, who has had five years' experience as a practicing physician, may act as a pharmacist, without examination, but subject to such registration and renewal as is provided for in this act.

Section 1760. A resident assistant pharmacist, within the meaning of this chapter, shall be a clerk or assistant in a retail drug or chemical store or pharmaceutical department, who shall have obtained a certificate as such registered assistant pharmacist from the board of pharmacy under the provisions of this chapter; and it shall be unlawful for such registered assistant pharmacist to supervise, manage or take charge of any pharmacy or retail drug or chemical store or pharmaceutical department, except that during the temporary absence of the registered pharmacist, who is proprietor or manager thereof, he may act in the place of the said registered pharmacist: provided that said temporary absence shall not in any one case exceed six consecutive days, and that the total temporary absence of such proprietor or manager shall not in the aggregate exceed the period of thirty days in any year; and it shall be unlawful for any registered assistant pharmacist to engage in the occupation of compounding or dispensing medicines or prescriptions of physicians or otherwise, or of selling at retail for medicinal purposes any drugs, chemicals, poisons or pharmaceutical preparations, except when engaged or employed in a pharmacy or retail drug or chemical store or pharmaceutical department

which is in charge of and is under the supervision and actual management of a registered pharmacist. No person not registered as pharmacist or assistant pharmacist shall be allowed by the proprietor or manager of any retail drug or chemical store or pharmaceutical department to compound or dispense the prescriptions of physicians, except as an aid under the supervision of a registered pharmacist or registered assistant pharmacist, who shall be present in the said pharmacy or pharmaceutical department at the time.

Section 1761. Any person registered as a pharmacist by any reputable Board of Pharmacy, or a graduate of any reputable college of pharmacy, who shall during any interval between the meetings of the Board of Pharmacy of this State, desire to perform the duties of such registered pharmacist in this State, shall apply to the secretary of said Board for a permit so to do, and the secretary, on the presentation of satisfactory evidence that the said applicant is a licentiate of some reputable board of pharmacy, or registered as pharmacist by such Board, or a graduate of same reputable college of pharmacy, shall issue to him a permit to perform said duties until the next meeting of the said Board, at which time he shall present himself before said Board for examination, and on his failure so to do he shall thereafter, until such time as he shall pass a satisfactory examination before said Board, only be granted temporary permits to perform said duties in this State; the total period of said temporary permits to any one person between any two meetings of the said Board shall not at any one time exceed thirty days in the aggregate. The applicant shall pay to the secretary a fee of one dollar for each permit issued.

Section 1762. Every registered pharmacist and registered assistant pharmacist who desires to continue the practice of his profession shall annually, on or before the first day of March, pay to the secretary of the board of pharmacy a registration fee of one dollar, for which he shall receive a renewal of said certificate of registration, and every certificate of registration, and every last renewal thereof, shall, at all times, be conspicuously exposed in the prescription department of the drug or chemical store to which it applies, or in which the said person is employed or engaged.

Section 1763. It shall not be lawful for any person having authority to sell or dispense medicines or poisons to retail any poisons enumerated in the following schedules, "A" and "B" without distinctly labelling the bottle, box, vessel or paper in which said poison is contained, with the name of the article and the word "poison," and the name and place of business of the seller, and in addition thereto at least two of the most readily obtainable effective antidotes to such poisonous article.

SCHEDULE "A."

Arsenic and its preparations, corrosive sublimate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnine and its salts, and essential oil of bitter almonds.

SCHEDULE "B."

Aconite, belladonna, nux vomica, savin, ergot, cotton root, cantharides, digitalis, colchicum, conium, henbane and their pharmaceutical preparations; creosote, croton oil, chloroform, chloral hydrate, carbolic acid, oxalic acid, white and red precipitate, morphine and its preparations, opium and its preparations, except paregoric and other preparations of opium containing less than two grains to the ounce, and all other deadly poisons.

Nor shall it be lawful for any person to sell or deliver any poisons mentioned in the said schedules "A" and "B," unless upon due inquiry it be found that the purchaser is aware of its poisonous nature, and represents that it is to be used for a legitimate purpose, nor to any person under sixteen years of age, except upon the written order of some responsible person.

Nor shall it be lawful for any person to sell any poison mentioned in schedule "A" without, before delivering the same to the purchaser, causing an entry to be made in a

book to be kept for that purpose, always open to the inspection of the proper officers of the law, stating the date of sale, name and address of purchaser, name and quantity of poison sold, purpose for which it is required, as represented by the purchaser, and name of the dispenser.

The provisions of this section shall not apply to the dispensing of poison in usual doses on prescriptions of physicians or veterinary surgeons, put up by registered pharmacists or registered assistant pharmacists, or dispensed by a physician or veterinary surgeon in his regular practice.

Section 1764. No person shall, within this state, manufacture for sale, offer for sale or sell any drug which is adulterated within the meaning of this section.

The term "drug," as used in this section, shall include all medicines for internal and external use, antiseptics and cosmetics.

A drug shall be deemed to be adulterated within the meaning of this section—

(1) If, when sold under or by a name recognized in the United States Pharmacopœia, it differs from the standard of strength, quality or purity laid down therein; (2) If when sold under or by a name not recognized in the United States Pharmacopœia, but which is found in some other pharmacopœia or other standard work on materia medica, it differs materially from the standard of strength, quality or purity laid down in such work; (3) If its strength, quality or purity falls below the professed standard under which it is sold.

Every person manufacturing, offering or exposing for sale, or delivering to a purchaser any drug included in the provisions of this section, shall furnish to the state chemist or other officer of the law, who shall apply to him for the purpose, and shall tender him the value of the same, a sample sufficient for the analysis of any such drug which is in his possession, but the provisions of this section shall not apply to any retailer selling goods in original packages, or drawn therefrom, except the provision as to samples or analysis.

Section 1765. None of the provisions of this chapter, except those contained in sections seventeen hundred and sixty-three and seventeen hundred and sixty-four, shall prevent the sale by merchants of quinine, epsom salts, castor oil, essence of peppermint and other flavoring preparations, calomel, camphor, iodide, bromide and chlorate of potassa, opium, paregoric and sweet oil, and such other domestic and proprietary medicines as are usually kept by retail dealers; but the sale of laudanum, morphine and proprietary medicines must be in original packages as obtained from druggists.

Section 1766. Any person violating the provisions of section seventeen hundred and fifty-nine of this chapter shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined not less than ten nor more than one hundred dollars, and each day that the said provisions, or any of them, are violated shall constitute a separate and distinct offence.

Any registered assistant pharmacist who, in violation of section seventeen hundred and sixty of this chapter, shall manage, control or have charge of any pharmacy or retail drug or chemical store or pharmaceutical department longer than six consecutive days at any one time or longer than thirty days in any one year in the aggregate, shall be guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than ten nor more than one hundred dollars, and each day that he remains in management or charge of such pharmacy or drug or chemical store or pharmaceutical department in excess of the periods authorized by said section shall constitute a separate offence; and any registered pharmacist who violates any of the provisions of section seventeen hundred and sixty shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than ten nor more than one hundred dollars, and each day's violation of the said provisions shall constitute a separate offence.

Any person owning or managing a pharmacy, retail drug or chemical store or pharmaceutical department who shall in violation of the provisions of section seventeen hundred

and sixty, allow any person not registered as pharmacist or assistant pharmacist to compound or dispense the prescriptions of physicians, except as an aid under the supervision of a registered pharmacist or registered assistant pharmacist, who shall be present in the said pharmacy or pharmaceutical department at the time, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than ten nor more than one hundred dollars for each and every offence.

Any registered pharmacist or registered assistant pharmacist who, in violation of the provisions of section seventeen hundred and sixty-two of this chapter, fails to renew his certificate of registration and to expose the said certificate and last annual renewal thereof in accordance with the provisions of the said section, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than ten nor more than twenty-five dollars, and each day he continues to carry on or be engaged in such business without such renewal and such exposure of said certificate and renewal shall constitute a separate offence.

Any person violating any of the provisions of section seventeen hundred and sixty-three shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than ten nor more than one hundred dollars for each and every offence.

Any person violating any of the provisions of section seventeen hundred and sixty-four, or who refuses to comply upon demand with the requirements thereof, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not less than ten nor more than one hundred dollars, or imprisonment not exceeding thirty days, or both; and any person found guilty of violating the provisions of section seventeen hundred and sixty-four shall be adjudged to pay, in addition to the penalties hereinbefore provided for, all necessary cost and expense incurred in inspecting and analyzing such adulterated articles which said persons may be found guilty of manufacturing, selling or offering for sale; and in addition thereto, if he be a registered pharmacist or assistant registered pharmacist, his name shall be stricken from the register. In all prosecutions under this chapter the Board of Pharmacy of the State of Virginia shall constitute the informer, and one-half the fines imposed by this section shall go to the said Board of Pharmacy, and the other half to the commonwealth.

2. All acts and parts of acts in conflict with this act, are hereby repealed.

3. This act shall be in force from and after July first, eighteen hundred and ninety-four.

OFFICE OF CLERK OF HOUSE OF DELEGATES
AND KEEPER OF THE ROLLS OF VIRGINIA,
RICHMOND, VA., March 21, 1894.

The foregoing is the copy of an Act entitled an Act to amend and re-enact sections 1756, 1757, 1758, 1759, 1760, 1761, 1762, 1763, 1764, 1765 and 1766 of chapter 78 of the code of Virginia, in relation to the practice of pharmacy, as amended by an Act approved May 6, 1887, entitled an Act to amend and re-enact sections 6 and 12 of an Act approved March 3, 1886, entitled an Act to incorporate the Virginia Pharmaceutical Association, and to regulate the practice of pharmacy, and to guard the sale of poisons in the State of Virginia, approved March 5, 1894.

J. BELL BIGGER,
C. H. D. and K. of R. of Va.

WISCONSIN.

Chapter 167, Laws of 1882, as Amended in 1885, 1887 and 1895.

An Act to Amend Chapter 167 of the Laws of 1882, as Amended by Chapter 146 of the Laws of 1885, and Chapter 460 of the Laws of 1887, Relating to the Practicing of Pharmacy, the Licensing of Persons to Carry on Such Practice and the Sale of Poisons in the State of Wisconsin.

The People of the State of Wisconsin, represented in Senate and Assembly, do enact as follows:

Section 1. Chapter 167, of the laws of 1882, as amended by chapter 146 of the laws of 1885, and as amended by chapter 460, of the laws of 1887 is hereby amended so as read, when amended, as follows: Section 1. There is hereby established a Board of Pharmacy of the State of Wisconsin. Such board shall consist of five resident pharmacists. The term of office of the members of said board shall be five years each, and until their successors have been duly appointed and qualified, so ordered that the term of one member of said board shall expire each year. Death, removal from State, or resignation of a member, shall constitute a vacancy, which shall be filled for the remainder of the term by appointment as in the case of an expiration. Said board shall have the power specified in this act.

Sec. 2. The Wisconsin Pharmaceutical Association shall annually elect three pharmacists for recommendation to the governor of the State. Upon the expiration of the term of office of any member of the Board of Pharmacy, or in case of vacancy on said board, the governor shall appoint a successor, or fill such vacancy by appointing a person who shall have been at some time recommended by said association.

Sec. 3. The said board shall hold an annual meeting in the month of March, the time and place of which shall be designated by the president and secretary of the board. At such annual meeting said board shall elect a president, secretary and treasurer, who shall hold office until the next annual meeting, and until their successors are elected and qualified; provided that the board may appoint as secretary and treasurer some person not a member of the board. The said board shall have power to make by-laws for the government of the board, and for the proper execution of its duties. The board shall hold meetings for the examination of applicants for registration as pharmacists and assistant pharmacists, who shall be known as "Registered Pharmacists," and "Registered Assistant Pharmacists." Said meetings shall be held at least once in three months, and any business may be transacted at such meetings which pertains to the duties of the board. Thirty days' public notice of a meeting, when held for the purpose of examination, shall be given by said board. The board shall examine all applicants for registration when application shall be made in accordance with the by-laws of the board and with this act, and when applicants shall be found competent, they shall be granted certificates of registration. The board shall grant certificates of registration and register such persons as may be entitled to the same under this act. They shall cause the prosecution of all persons violating any of the provisions of this act; shall report annually to the governor, and to the Wisconsin Pharmaceutical Association, upon the condition of pharmacy in this state, which report shall also contain a record of the proceedings of the board for the year preceding, the receipts and disbursements of the board, the names of all persons registered as pharmacists or assistant pharmacists. Three members of said board shall constitute a quorum. The secretary of said board shall keep a record of the proceedings of the board and shall keep a book of registration in which shall be entered the names and places of business of all persons registered under this act, with the reason justifying their registration. Such books shall be prima facie evidence of what persons are registered pharmacists and registered assistant pharmacists in this state. The secretary shall receive a salary to be determined by the board, and his traveling and other expenses in-

curred in the performance of his official duties, and shall give such bond as the board shall from time to time direct. The other members shall receive the sum of five dollars for each day actually engaged in such service, with the necessary expenses incurred in attending meetings of the board. Such salary, compensation, expenses and other disbursements by the board shall be paid from the fees received by the board under this act, and no part thereof shall be paid out of the state treasury. All moneys received by the board in excess of the disbursements made by the board shall be held by the treasurer as a fund from which to pay the expenses of the board.

SEC. 4. All persons now registered as pharmacists by the board shall be entitled to practice their profession in accordance with this act. The board shall hereafter issue certificates of registration, and register as pharmacists those persons who shall be twenty-one years of age or over, and shall have had five years' practical experience in a drug store, wherein prescriptions of medical practitioners are compounded, and shall sustain a satisfactory examination before the board, and shall comply with the provisions of this act, and graduates of the several courses of the department of pharmacy of the University of Wisconsin, and of other universities and colleges giving like courses, shall be entitled to certificates of registration upon proof of two years' instead of five years' practical experience in a drug store, and upon sustaining like examinations and complying with the other provisions of this act. All of which facts shall be made to appear to the satisfaction of the board. Such persons as are now registered, or may hereafter be registered under this act, shall be entitled to practice their profession under such registration until the expiration of the time for the renewal thereof under this act, and upon failure to renew such registration, as herein provided, such registration shall cease and be invalid.

SEC. 5. Every registered pharmacist who desires to continue the practice of his profession, shall annually, during the time he shall continue such practice, on such date as the board may determine, apply for the renewal of his registration and pay the fee herein provided for such renewal. If any registered pharmacist fails to procure a certificate of renewal for sixty days after the secretary of the board shall have mailed him a notice a second time of the expiration of his registration, he shall cease to be a registered pharmacist within the meaning of this act. Such person to again become a registered pharmacist shall proceed as required for an original registration.

SEC. 6. Said board shall issue a certificate and register such persons as registered assistant pharmacists as shall have reached the age of eighteen years and have had two years' practical experience in drug stores where prescriptions of medical practitioners are compounded, and shall pass a satisfactory examination before said board, and shall comply with the provisions of this act; all of which facts shall be made to appear to the satisfaction of the board. Every registered assistant pharmacist, who desires to continue the practice of pharmacy as in this act provided, shall annually, during the time he shall continue such practice, on such date as the board may determine, apply for a renewal of his registration and pay the fee herein provided for such renewal. If any registered assistant pharmacist shall fail to take out a certificate of renewal for sixty days after the secretary of the board shall have mailed him a second notice of the expiration of his registration, he shall cease to be a registered assistant pharmacist, within the meaning of this act. Such persons, to again become registered assistant pharmacists, shall proceed as required for original registration.

SEC. 7. Every certificate of registration and the renewal thereof, which is in force, shall be conspicuously exposed in the pharmacy in which the pharmacist, to whom it is issued, practices. And if any registered pharmacist or any registered assistant pharmacist shall fail or neglect to so conspicuously expose such certificate, or renewal, he shall forfeit ten dollars for each and every such failure or neglect.

SEC. 8. Every person applying for registration shall pay the board a fee of five dollars at the time of making the application, and if the board shall for any reason refuse to

register the applicant, three dollars thereof shall be refunded. Every person applying for renewal of a certificate of registration shall pay the board, at the time of making the application, such fee as may be fixed by the board, which fee shall not exceed the sum of two dollars.

SEC. 9. It shall be unlawful for any person to retail, compound or dispense drugs, medicines or poisons, except Paris Green put up in packages, labeled "Paris Green, Poison," or to institute or conduct any pharmacy, store or shop for retailing, compounding or dispensing drugs, medicines or poisons in any town, city or village having five hundred or more inhabitants, unless such person shall be a registered pharmacist, or shall employ and place in charge of such pharmacy, store or shop a registered pharmacist. And in case any person shall so retail, compound or dispense drugs, medicines, or poisons, or shall so institute or conduct a pharmacy, store or shop for retailing, compounding or dispensing drugs, medicines or poisons, he shall forfeit fifty dollars for each such offense. Any person who shall permit the compounding or dispensing of prescriptions, or the vending of drugs, medicines or poisons in his store or place of business in a town, city or village having five hundred or more inhabitants, except by a registered pharmacist, shall forfeit fifty dollars for each such offense. It shall be unlawful for any person to retail, compound or dispense medicine, drugs or poisons or to institute or conduct any pharmacy, store or shop, for retailing, compounding or dispensing drugs, medicines or poisons, in any town, city or village having less than five hundred inhabitants, unless such person shall be a registered pharmacist or registered assistant pharmacist, or shall employ and place in charge of such pharmacy, store or shop, a registered pharmacist or registered assistant pharmacist; and in case any person shall so retail, compound or dispense drugs, medicines or poisons, or shall institute or conduct any pharmacy, store or shop for retailing, compounding or dispensing drugs, medicines or poisons, he shall forfeit fifty dollars for each such offense. Any person who shall permit the compounding or dispensing of prescriptions or the vending of drugs, medicines or poisons, in his store or place of business in a town, city or village having less than five hundred inhabitants, except by a registered pharmacist or a registered assistant pharmacist, shall forfeit fifty dollars for each such offense; provided that under the personal supervision of a registered pharmacist, a registered assistant pharmacist may compound or dispense prescriptions and vend drugs, medicines or poisons without such forfeiture being incurred; and provided, that nothing herein shall be construed to in any manner interfere with any physician in regular practice from dispensing his own medicines or preventing him supplying his patients with such articles as may seem to him proper, or interfere with the making and vending of proprietary medicines in sealed packages with the name of the contents, the directions for using, and the pharmacist registered in this State or physician by whom prepared and compounded, thereon, nor with the sale of the usual domestic remedies, nor with the exclusively wholesale business of any dealer.

Section 10. Any person who shall wilfully make a fraudulent statement or representation to procure registration for himself, or for any other person, under this act, or who shall violate any provisions of this act for which a specific penalty or forfeiture is not provided, shall for each and every such offense forfeit the sum of fifty dollars.

SEC. 11. Every owner or conductor of a drug store shall be responsible for the quality of all drugs, chemicals or medicines, sold or dispensed by him, except those sold in the original package of the manufacturer, and except those articles known as patent or proprietary medicines. And should any such owner or conductor of a store intentionally and fraudulently adulterate, or cause to be adulterated, any drugs, chemicals or medical preparations sold in such store, he shall, for any and every such offense, forfeit the sum of one hundred dollars; and if such person shall be a registered pharmacist or registered assistant pharmacist, his registration and certificate of registration may be, by said board, revoked and annulled; whereupon such person shall cease to be a registered pharmacist or registered assistant pharmacist.

SEC. 12. No person shall sell or retail any poison commonly recognized as such, except Paris Green put up in packages and labeled "Paris Green, Poison," and especially aconite, arsenic and its preparations, belladonna, biniodide of mercury, carbolic acid, chloral hydrate, chloroform, conium, corrosive sublimate, creosote, croton oil, cyanide of potassium, digitalis, hydrocyanic acid, morphine, nux vomica, oil of savin, oil of tansy, oil of bitter almonds, oil of cloves, oxalic acid, opium and preparations of opium, phosphorus, sulphuric ether, strychnine, sugar of lead, sulphate of zinc, white precipitate, red precipitate, or any mixture containing enough of any of said poisons or of any combination of them sufficient to kill a person taking the same, without affixing to the box, bottle, vessel or package containing the same, and to the wrapper or cover thereof, a label bearing the name "poison" distinctly shown, together with the name and place of business of the seller. And every person who shall sell or retail any such poison, shall keep in his place of business a book, in which shall be entered an accurate record of the sale of all poisons; such record shall contain the amount purchased, the date, for what purpose purchased, and the buyer's name and address. This record shall be at all times, during ordinary business hours, subject to the inspection of the district attorney of the county in which such store is located, or of any authorized agent of said board. Any person failing or neglecting to comply with any of the provisions of this section shall be guilty of a misdemeanor, and upon conviction be punished by a fine not exceeding fifty nor less than five dollars.

SEC. 13. All actions for the recovery of the several forfeitures or penalties prescribed in this act, may be instituted in any court, having jurisdictions thereof, by any member of the board, and the members of said board are specially directed to institute such action. It shall be the duty of the district attorney of the county wherein such forfeitures or penalties are incurred, to prosecute all persons incurring any forfeiture or penalty when notified of the same, by said board, or any officer or agent thereof. Upon complaint made to any justice of the peace by any member of said board, showing that forfeiture has been incurred under this act, and that such justice of the peace has jurisdiction of an action therefor, such justice of the peace shall issue process thereon, as provided by statute, for the collection of forfeitures.

Section 14. The Board of Pharmacy of the State of Wisconsin as at present constituted, shall continue with all of the powers and duties with which the board is invested by this act. The present members of said board shall hold their office for the term for which they have been heretofore appointed, respectively, as designated in their appointment. The present officers of said board shall hold their respective offices until the expiration of the time for which they have been elected. The rules, regulations, by-laws and acts of said board shall continue in force and effect.

Section 15. All acts or provisions regulating the practice of pharmacy and the sale of poisons within this State, enacted prior to the passage of this act, are hereby repealed.

Section 16. This act shall take effect and be in force from and after its passage and publication.

Approved April 15, 1895.

CHAPTER 296, LAWS OF 1885, AMENDED.

Relating to the sale of Poisons by Pharmacists, etc.

Section 2, as amended by chapter 404, laws of 1887. There is hereby enacted a new section to be known as section 1548a of the revised statutes, which shall read as follows: Section 1548a. The town boards, village boards and common councils of the respective towns, villages and cities in this State, upon the written application of any registered pharmacist, may grant to such registered pharmacist as they deem proper a permit to sell strong, spirituous and ardent liquors, in quantities less than one gallon, for medicinal, mechanical or scientific purposes only, and not to be drank on the premises. The sum to

be paid for such permit shall be ten dollars, and such permit shall be granted and issued in the same manner and terminate at the same time as the license provided in the preceding section, except that it shall not be necessary for any such registered pharmacist to furnish the bond required by section 1549, of the revised statutes; provided, that in case any town board, village board or common council shall refuse to grant such permit, any registered pharmacist may sell such strong, spirituous and ardent liquors, for medicinal purposes only, on the written prescription, for each sale, of a practicing physician, competent to testify in any court in this state in a professional capacity, as provided by section 1436, of the revised statutes. It shall be the duty of every pharmacist to whom a permit is issued to keep a book, in which he shall enter the date of every sale made by him of any such liquors, the name of the person to whom sold, and the kind and quantity of and purpose for which such liquors are sold; and such book shall at all times be open to the inspection of the authorities granting such permit. It shall be the duty of every such pharmacist, on the third Tuesday of April in each year, to file with the clerk of the city, village or town in which the permit is granted, a verified copy of all the entries made by him in such book, as he is required by this section to keep.

SEC. 5. There is hereby enacted a new section, to be known as section 1550a of the revised statutes, which shall read as follows: Section 1550a. Any person who shall, for the purpose of inducing the sale of liquors by any registered pharmacist, holding a permit therefor, for any other use than medicinal, mechanical or scientific purposes, make any false statement or representation to such pharmacist, or any clerk or employé of such pharmacist, regarding the use for which such liquor is bought, and thereby induce such sale to be made in violation of law, or any registered pharmacist holding a permit under this charter who shall neglect or refuse to comply with any of the requirements of this chapter, shall be guilty of a misdemeanor, and, on conviction thereof, shall be punished therefor by a fine of not less than ten dollars, or more than forty dollars, besides the costs of suit; and in case of a second or any subsequent conviction of the same person, the punishment shall be a fine of not less than forty dollars or more than one hundred dollars, besides the cost of the suit; or by imprisonment, in the county jail of the proper county, not less than thirty days or more than three months; and in case of punishment by fine, such person shall, unless the fine and costs be paid forthwith, be committed to the county jail of the proper county until such fine and costs are paid, or until discharged by due course of law.

NOTE.—Liquor permits can be issued to registered pharmacists only, and not to firms. In case a proprietor of a drug store is not registered, the permit must be made out in the name of the registered man in charge of the pharmacy. Pharmacists should attend to this, and see that none but registered men receive certificates.

ANSWERS TO QUERIES CONCERNING REGISTRATION REQUIREMENTS.

BY F. W. SENNEWALD, OF MISSOURI.

No. 1. Our law recognizes only one grade of licentiates, called *Registered Pharmacists*, and fixes no age; the regulations require, however, it to be not less than eighteen years.

No. 2. In my opinion, only persons *competent in all branches of pharmacy* should be registered, as assistants holding second grade certificates will in ninety-five cases of every hundred overstep their authority. That the people could, or should, make a distinction between a first and second grade certificate can not be expected.

No. 3. No practical work has so far been required at our examinations. The folding of plaited filters, the division of a mass into two, three and five Gr. pills (by approximation), the exact division and folding of powders, the forming of supporitories, etc., and the reading of prescriptions, will, however, be introduced at an early date. The lege

artis performance of these simple manipulations, will at least, even in a small degree only, prove the qualification of the candidate in dispensing prescriptions.

No. 4. The required practical experience is fixed by the Board at three years.

No. 5. No distinction is made if this experience is obtained in a country or city drug store.

No. 6. The only experience accepted is that obtained in a pharmacy where physicians' prescriptions are compounded.

No. 7. The time spent at a reputable and *recognized* College of Pharmacy, including the practical work in the chemical and pharmaceutical laboratories of such, is considered as *practical experience*, and deducted from the three years required.

No. 8. Age, and time of experience, must be stated in an affidavit, made by the candidate, if demanded by the Board.

Certificates of registration were issued during the year 1894:

To Graduates in Pharmacy holding Diplomas of recognized Colleges	72
To Examinees	59
To M. D's. by virtue of their Diplomas, recognized by our State Board of Health	189
To Interchanges with other State Boards of Pharmacy	13
Total	333
Number of applicants examined by this Board	175
Failed to pass	116

Upon motion of Dr. Bartley, the Report on Legislation was received and referred to the Publication Committee.

THE CHAIR: If there are no other reports, we will proceed to the reading of papers.

Upon motion of Mr. Ryan, but fifteen minutes were allowed for the presentation of each paper during the remainder of this Session, and the following paper was read:

A NATIONAL PHARMACY, FOOD AND DRUG LAW NOT POSSIBLE UNDER THE PRESENT UNITED STATES CONSTITUTION.

BY J. H. BEAL.

A paper upon this subject might be considered unnecessary, were it not that communications addressed to the pharmaceutical journals with increasing frequency indicate the existence of a wide-spread belief in the powers of Congress to enact laws regulating these matters that would be operative within the territorial limits of the several States of the Union. Of the desirability of such legislation, if it were obtainable, there can be no doubt, but that it would be inoperative within the territorial limits of the States is plainly evident from a consideration of several well established principles of constitutional law.

The legislative powers of a State and of the nation are radically different in their origin, in their nature, and in their extent. To determine whether or not a State has power to enact a given piece of legislation, it is only necessary to inquire whether such legislation has been forbidden to it by its own Constitution, or by the Constitution, laws, or treaties of the United

States. If not forbidden by one of these, it is competent for the State to adopt the proposed legislation. With the legislative department of the general government, however, the case is exactly reversed. While the State may legislate upon any subject not forbidden to it, the Congress may legislate only upon such subjects as the Constitution expressly or impliedly places within its jurisdiction. If the express or implied authority to legislate upon a given subject is not found in the Federal Constitution, then the power to do so is as completely denied as if expressly prohibited. To quote the language of Chief Justice Marshall in an early case: "The United States can claim no powers which are not granted to it by the Constitution; and the powers actually granted must be such as are expressly given, or given by necessary implication." (Martin *vs.* Hunter, Wheat 326.)

It would puzzle the most ardent advocate of national sovereignty to find a clause in the Constitution even remotely sanctioning a law to regulate the practice of pharmacy, or the manufacture and sale of food or drugs within State limits. It can not be found within the power of Congress to regulate commerce, since this applies strictly to commerce *between* and not within the States. Neither could such matters be regulated by Congress under its police powers, since the general government has no police powers, except such as are strictly necessary to the discharge of its governmental functions. To quote from a decision of the Supreme Court, "In the American constitutional system, the power to establish the ordinary regulations of police has been left with the individual States, and it can not be taken from them, either wholly or in part, and exercised under legislation of Congress. Neither can the national government, through any of its departments or officers, assume any of the police regulations of the States. All that the Federal authority can do is to see that the States do not, under cover of this power, invade the sphere of national sovereignty, or deprive any citizen of rights granted by the Federal Constitution."

The probable fate of a national food and drug law is fairly illustrated by the case of the United States *vs.* DeWitt, 9 Wall., 41. This was a decision upon a clause of the Internal Revenue Act, which attempted to regulate the character and quality, and punish the adulteration of illuminating oils.

In delivering the opinion of the court, Chief Justice Chase says: "As a police regulation relating exclusively to the internal trade of the states, it can only have effect where the legislative authority of Congress excludes, territorially, all state legislation, as for example, in the District of Columbia. Within state limits, it can have no constitutional operation. This has been so frequently decided by this court that we think it unnecessary to enter upon the discussion."

It is clear from the decisions above referred to, and from many others which might be cited, that it is useless to expect national legislation upon the subject of food and drugs, or affecting the practice of pharmacy, that

would be operative within state limits, without an amendment to the Constitution conferring upon Congress express authority to legislate upon these subjects.

Scio, Ohio, June 1, 1895.

Upon motion of Mr. Watson, Mr. Beal's paper was accepted and referred to the Publication Committee.

Mr. Sayre moved that the further reading of papers be dispensed with until to-morrow morning.

Seconded by Mr. Alpers and carried.

Upon motion of Dr. Stewart, the Section adjourned until Tuesday morning at 10 o'clock.

Third Session.—Tuesday Morning, August 20.

Chairman Good: The regular order of business would be the reading of papers, and then reports of committees. I would be willing to change the order of business.

On motion, the order of business was thereupon changed.

The Chairman called for the report of the Committee on the Chairman's Address.

Mr. Sheppard: I would like to ask the Secretary of that committee, Mrs. Miner, to read the report that the committee has prepared.

Mrs. Miner then read the following:

REPORT ON THE CHAIRMAN'S ADDRESS.

Mr. Chairman and Members: The Committee on the Chairman's Address makes the following report, and desires to state that while not unanimously agreeing in all the views expressed in the address, it most heartily concurs in the following:

1st. The remarks recommending a more thorough preliminary academic education for pharmacists.

2d. The recommendation concerning a model law.

3d. That "Our methods must not be copied after any European model, not that we should not avail ourselves of any valuable hints given by those older institutions, but our system must be adapted to the needs of Americans, and it will therefore itself be American."

4th. That the *art* of pharmacy should be taught as well as a knowledge of the subjects involved, special attention being given to laboratory work.

5th. That the By-Laws should be amended (Art. I, Chap. VII.) so as to increase the Committee on Pharmaceutical Legislation to five members, thereby giving a fuller representation from our colleges and State Boards.

6th. That re-registration, with a small fee, should be compulsory.

7th. That a committee be appointed to urge upon Congress the passage of a law making the metric system the only legal system for use in the Customs service.

8th. The Chairman's general outline for this Section, pertaining to the systematic efforts to improve and correct educational conditions, correct faulty legislation, suggest-

ing grades in examination and the co-operation of State Associations and State Boards with the National Association.

Signed, S. A. D. SHEPPARD,
J. T. McGILL,
MRS. M. O. MINER.

On motion of Prof. Oldberg, the report was received and adopted.

Upon motion of Prof. Oldberg, the recommendations contained in the Report of Committee on the Chairman's Address were referred to the newly elected officers of the Section.

The Committee on Resolutions in regard to the registration of poisons, reported verbally through Mr. Remington, as follows:

MR. REMINGTON: I would say that Prof. Prescott has left. He had a consultation with Mr. Alexander and myself, and suggested that there was so little time, that the Committee make a report in time to be published in the Proceedings.

Mr. Sheppard moved that the report be received, and that the Committee be instructed to submit their final report to the Committee on Publication.

The following resolutions were subsequently reported by the Committee and transmitted to the Permanent Secretary for publication:

RESOLUTIONS UPON THE RESPONSIBILITY OF THE PHARMACIST FOR REGISTRATION OF THE SALE OF POISONS.

WHEREAS, The statistics obtained by this Association, as to the number of deaths from poison, again make manifest the necessity of the registration of the sale of poisons by the pharmacist;

Whereas, It appears that such registration is not yet universal in the practice of pharmacists, and is not required by the laws of all the States; therefore,

Resolved, That we ask the attention of pharmacists everywhere to the importance of their responsibility for the registration of the sale of poisons. In a very large proportion of all cases of poisoning, whether accidental, suicidal, or homicidal, the poison itself has been purchased of a pharmacist, and he is therefore especially called upon for statement of the article dispensed, just what it was, in what quantity, to whom it was furnished, and upon what request of the applicant. This information is asked by the relatives and guardians of the person who is poisoned, by the coroner and the courts of law. If the pharmacist fail in his responsibility to give account of a sale of poison in his own business, his inability may entail upon the public the burden of expensive investigation in order to obtain facts more surely given by a simple record of the poison sale.

Moreover, the pharmacist cannot forget that his professional and legal status, in the public estimation, depends mainly upon his responsibility in the sale of poisons, and medicines which become poisonous when wrongly used. It is because of this responsibility that the people have enacted State laws for pharmacy, with boards of examination, fees for registration, and so forth. There are few professions for which the States so readily make laws for the safeguard of suitable qualification to practice, as for this business having in charge the dispensing of poisons for remedial uses. Any instance of poisoning in which it appears that the agent of death was sold by a pharmacist who can give no account of the sale, becomes *an injury to the honor and repute of pharmacy at large*.

Resolved, That the Association recommend that all pharmacists should record the date,

the name given by the purchaser, the name and quantity of the article, and the purchaser's statement as to the use for which he obtained the poison. The articles subject to registration should be such as are liable to use in suicidal or homicidal poisoning, and those generally liable to cause accidental poisoning. It will be understood that this recommendation does not affect the prescriptions of physicians, which are filed as such. The practice of registration brings the judgment of the dispenser to bear upon his duty. It is the best incentive to the exercise of discrimination as to when an applicant for poison should be denied. It is a reminder that responsibility is not all fulfilled by the affixing of a poison label.

Resolved, That in the opinion of this Association no States should remain without laws requiring pharmacists to register poison sales. And this Association requests the State Pharmaceutical Associations, through their Committees of Legislation, and requests the Boards of Pharmacy in making their annual reports in the several States, to strenuously urge the importance of suitable legislation in the matter here presented.

Resolved, That in the absence of registration laws the pharmacist nevertheless regard himself as a law sufficient to insure the registration of the sale of poisons.

ALBERT B. PRESCOTT,
JOSEPH P. REMINGTON,
M. W. ALEXANDER,
Committee.

THE CHAIRMAN: There is another matter which was referred to in the President's address a year ago; a recommendation that the Sections on Education and Legislation and on Scientific Papers present to the Association an outline of a course of instruction in pharmacy, such as in their estimation would be desirable for schools to conform to as far as practicable, and the committee suggested that the Section be requested to prepare this outline for presentation to the next meeting of the Association. I will make my verbal report, as I was elected chairman of that committee. The Committee consisted of the officers of the Section of Legislation and Education and of the Scientific Section. The Secretary of this Section sent a circular letter to all the colleges, asking that an outline of the instruction followed in the college in each case be submitted to this committee. But few responses were received, that is, in comparison to the number of colleges; mainly the catalogues were sent, and a few of the outlines. We have heretofore published in our Proceedings one or two outline courses of instruction in such institutions, and this Committee recommends that the outline courses presented, one by Dr. Dohme, of Baltimore, and the other by the Michigan University, be submitted to the Publication Committee with discretion as to whether or not they shall publish them. I would say that it has been the custom to publish a brief outline from year to year in our Proceedings; but I would like the Publication Committee to take the responsibility. We submit only these two for their consideration.*

On motion of Prof. Oldberg, it was agreed that the suggestion of the Chairman be adopted.

The Chairman announced that owing to the limited time at the disposal of the Section, one or two papers would be read and the rest referred by title to the Publication Committee.

The first paper was read by the author, as follows:

* The text of these two papers will appear at the end of the Minutes of this Session, together with that of other papers read by title.

PROPOSED CURRICULUM, FOR CANDIDATES BEFORE BOARDS OF PHARMACY.

BY WM. C. ALPERS.

PHARMACY.

Assistant—Physical laws applied in pharmacy ; the balance ; weights and measures ; different kinds of thermometers ; specific gravity ; spectrum ; percentage-solutions ; percolation ; maceration ; etc. ; vehicles and excipients.

Pharmacist—Potent drugs and their strength ; alkaloidal drugs ; incompatibles ; solubility ; assaying all official preparations and their ingredients ; difficulties in preparing official preparations, and how to overcome them ; extraction of alkaloids, glucosides, resins, etc.

MATERIA MEDICA, BOTANY, AND PHYSIOLOGY.

Assistant—Vegetable morphology ; parts of plants, and their functions ; official drugs, their habitat and medicinal properties ; therapeutic terms ; simple pharmacognosy ; primary physiology ; different organs of the human body, their uses and functions, especially the respiratory and alimentary organs.

Pharmacist—Systematic botany and vegetable physiology ; natural orders of all official drugs ; growth of plants and their chemical constituents ; history of each drug, from gathering to dispensing ; therapeutic terms continued ; pharmacognosy ; microscopy.

CHEMISTRY.

Assistant—Inorganic chemistry ; symbols and terms, atomic and molecular weights ; chemical equations ; chemical incompatibles ; formulas of all official chemicals ; qualitative analysis.

Pharmacist—Inorganic chemistry ; preparation of all official chemicals, their possible adulterants, testing for and detecting adulterants ; quantitative analysis ; examples in stoechiometry. Organic chemistry : notation ; hydrocarbons ; ethers and alcohols, carbo-hydrates ; chemistry of alkaloids, glucosides, etc. ; analysis of water, urine, food, etc.

TOXICOLOGY, PRESCRIPTIONS AND DOSES.

Assistant—Prescriptions with potent drugs ; doses of all drugs ; antidotes of potent drugs ; prescription Latin ; definition of Latin terms and abbreviations used in prescriptions ; translations of Latin prescriptions into English, and vice versa.

Pharmacist—Symptoms of poisoning by drugs or chemicals ; antidotes, and how to apply them ; prescription difficulties ; testing for poisons in food or water ; examining contents of stomach ; bacteriology ; ptomaines and leucomaines.

The proposed curriculum is not merely a theoretical thesis or proposition, but the result of long and careful observation of workings of the various Boards of Pharmacy, and the writer's own practical experience in a three years' service on the New Jersey Board.

It is hardly probable that the question of the usefulness of such a curriculum will be raised. To leave the formation and scope of questions to the momentary inspiration of the examiner, who a few days before the appointed date writes out his question sheet without previously communicating with his fellow members, is, to say the least, a very lax and certainly inefficient way of performing his duties; and the vagueness of the majority of questions and their varied scope show even to the superficial observer, that a fixed, strictly defined plan and purpose is wanting. The office of members of State Board of Pharmacy, which almost without exception is an honorary one, requires for its faithful performance great devotion and sacrifice in time. Granting that the former is always given, it is a fact that at the present state of small profits and consequently longer hours of labor, and less help, many examiners cannot devote the necessary time to their office, and the meetings of the Boards, instead of extending over two or three days, are often restricted to one or even half a day; examinations are rushed through, each examiner puts the answers in his pocket and corrects them at his leisure, and the future of a young aspiring man is made to depend on such superficial work.

Often, also, are the questions criticised with severity. One critic considers them too difficult, the other too easy; and the ideas of what a pharmacist should know are as varied as there are Boards or even pharmacists.

There also exists in some quarters a kind of jealousy among different Boards, each one claiming superiority for their examination, and refusing on that account to recognize certificates from other Boards; a friendly deliberation and comparison of requirements seems to be a matter of impossibility.

It is a natural and just demand that the candidates should be told clearly in what branches and to what extent in each branch they will be examined, and as the publication of old questions seems to be objectionable to many examiners, the adoption of a curriculum is not only a matter of desirability but of justice. Such a curriculum will also be a safe guide to those pharmacists who in the hard struggle for existence have not forgotten their duty to the rising generation, and believe that an apprentice has a claim on the interest and instruction of his preceptor.

In the compilation of the curriculum it will be noticed that two grades have been established, assistant and registered pharmacist, and consequently two examinations. The position of assistant, which has already been introduced in a number of States, seems to be an essential step from apprenticeship to final registration, and is besides a desirable help to many pharmacists who can hardly afford to engage a regular pharmacist as clerk.

Wherever the law does not recognize such an assistant, the State Association should spare no effort to have it changed; but even by cutting the assistants' examination out of the curriculum, it remains, nevertheless, of the same importance and usefulness.

The division of the whole scope of pharmaceutical education into four branches, namely, Pharmacy, Materia Medica, Chemistry, and Toxicology, is made in accordance with the established custom in the author's State, but is by no means claimed as something essential or necessary; the last branch might just as well be omitted, and its subjects added to Materia Medica or Pharmacy.

That the proposed curriculum will meet with the approval of every pharmacist cannot be expected. It will not only take long deliberations and arguments to establish it as satisfactory to a majority, but also,—and this is of greater importance—a practical test extending over years. So that the work presented here is nothing but the first stroke of the spade to build a road through the desert of confusion and uncertainty. The State Association of New Jersey has already adopted this curriculum at the last meeting, and instructed the Board of Pharmacy to conduct the examination accordingly.

The assistant can, during the temporary absence of the registered pharmacist, take the latter's place, and should, therefore, be able to perform all the work that the registered pharmacist must otherwise perform, or answer all pertinent questions.

The knowledge of all official drugs, their preparations, doses and antidotes, must be expected of him, as well as that of therapeutic terms. He must be able to identify drugs and give an intelligent account of the part of the plant from which they are derived, which implies the knowledge of vegetable morphology. The composition of official chemicals should form a part of his examination, as well as their formulas, chemical antidotes, incompatibles and medicinal properties. He must be versed in prescription reading, and therefore, understand all Latin terms and abbreviations.

The study of natural physical laws relating to the balance, weights and measures, specific gravity, thermometer, action of light and heat on chemicals, etc., is indispensable, as well as the knowledge of percolation, maceration and other pharmaceutical manipulations, and should, therefore, be included in the examination. Qualitative analysis and a primary knowledge of physiology might also be added.

That the examination of the registered pharmacist should also embrace all these disciplines goes without saying. But a new important feature arises with him. He is responsible for the reputation of his pharmacy; he must guarantee the purity of his stock, and warrant the full strength of all his drugs in alkaloids and other active principles. He must, therefore, be able to detect adulterations or sophistication, and should be examined in quantitative analysis, assaying and testing. His botany should not only

consist in simple morphology, but also embrace classification and vegetable physiology.

Discovery of poison in the stomach or intestines, analysis of water, urine, and food, have of late often been pointed out as valuable extensions of the occupation of the pharmacist, and should, therefore, be included in his examination.

Such a curriculum, even if it should reach a state of perfection after many years' practice and revision, cannot be the only means of ascertaining the candidate's fitness; a practical examination, consisting besides prepation of prescriptions or compounds, in testing adulterated drugs and assaying others, should never be omitted, and the addition to both of an oral examination is greatly to be recommended.

The question might be raised, why all this is brought before the National Association, who can neither instruct a Board of Pharmacy, nor exercise any influence on State Legislatures? and it might be argued that the whole subject belongs rather to State Associations, who are in close contact with their respective Boards, and can instruct or order them to adopt the curriculum.

To a certain degree such an objection is justified. But with the same right many other questions of pharmaceutical education and legislation might be stricken from our calendar, and the workings of our Association reduced to strictly scientific problems.

The very importance of the subject at issue, and the wide reputation of our Association as a National one, makes it compulsory for us to consider such questions; and even if we can exercise no direct influence on State Associations or Legislatures, we can bring to bear a powerful moral influence, and thereby work for the establishment of a *National Pharmacy*. Those members of State Associations or Boards, who believe that they must carefully guard an imaginary wall around the area of their State, over which nothing must escape or be brought in, will disdainfully smile at a suggestion of a general curriculum, and this paper does not appeal to them. But there are hundreds who take a broader view, and will cheerfully help to free our profession from restrictions and difficulties with which State barriers hamper it. The Boards of Pharmacy should awaken to the ideal conception of their duty; they are not only the examiners and grantors of certificates in their own States, but should be the leaders and champions of pharmacy, destined to lead our cherished profession to harmonious union and strength. Such a curriculum once adopted by the majority of our State Boards will also exercise a powerful influence on our colleges. Their graduates, in order to successfully appear before any Board, would have to be taught after a similar plan of study, one that would by no means be inferior to the one proposed; and the test for efficient work of a college would not be the number of its graduates, but rather the success with which they appear before the Board.

Thus we would not only harmonize and strengthen the State Boards, but also the colleges, and through them establish a National Pharmacy.

MR. SAYRE: I had an opportunity of reading this paper last evening. I want to say I enjoyed it very much, and I want to say also that I prize such a paper as this coming from a member of the State Board. Papers like this one will help the educational work. I propose to read this paper to the first class that I have in the University of Kansas. I trust that we will, by a motion, receive this paper, and I now make a special motion that this be received and referred to the Publication Committee.

DR. MCGILL: In seconding that motion I wish to make another motion.

The original motion of Mr. Sayre was put and carried.

DR. MCGILL: Now, Mr. Chairman, I move that the Secretary of this Section be directed to send a copy, as we no doubt have copies sufficient to send, to each member of the Board of Pharmacy, or the officers or Secretary of the Board of Pharmacy of each State, with our endorsement, or with our request for a kind consideration on their part.

Seconded and carried.

DR. WHELPLEY: I trust the Secretary, in transmitting these copies, will recommend it by a letter sufficiently explicit to attract and impress upon the Secretary of each Board the importance of this action. I was astonished, to say the least, to hear that the Secretary of one of the Boards answered this Committee that he hadn't time to give information that was requested, and I think that we should give the Secretaries of the various Boards to understand that they should take the time to consider these things.

Upon motion the recommendation was agreed to.

MR. OLDBERG: I move that a vote of thanks be tendered to Mr. Alpers for his paper. This is something we should have had years ago. It really is wonderful that we have had State Boards and State Board Examiners in all our States for many years, and I have never yet seen a scheme stating the scope covered by the examinations. It is high time that we should have it, and I think Mr. Alpers deserves high praise in having undertaken it. It involves considerable labor.

Motion seconded.

MR. HALLBERG: Without in any way detracting from the paper of Mr. Alpers, I want to call the gentleman's attention to the fact that a paper similar in character was presented to this Section last year, and is incorporated in the report of the Proceedings.

MR. OLDBERG: Giving a complete scheme?

MR. HALLBERG: Yes, sir.

The motion of Prof. Oldberg was agreed to.

The Chairman then called upon Mr. Joseph Jacobs to read a paper that was intended to be read before the Commercial Section, but on the suggestion of several members it was referred to the Educational Section.

Mr. Jacobs then read his paper, which is as follows:

THE PRACTICAL SIDE OF TRAINING IN OUR COLLEGES OF PHARMACY.

BY JOSEPH JACOBS.

For purposes of special study and special work, our body has wisely been divided into convenient and different Sections. This well-made classification enables us to bring to bear the best skilled forces upon particular fortifications of error and to mass them for the destruction of such strongholds.

I will be pardoned, nevertheless, for choosing a subject connected with the Educational Section, and thus over-stepping the jurisdiction of my own —the Commercial Section—if I shall invoke the philosophy teaching that it is well sometimes to "see ourselves as others see us;" and, surely, I will not forfeit your "love and friending" when I promise that, should my friends, the Professors, resort to the *lex talionis*, I will take my share of such medicines as they may administer, bitter and all, whether they be uncoated pills of advice, rank fluids of criticism, or even down-right gall of admonition.

While the teachers of pharmacy are wrangling about the proper designation to give graduates of their schools—whether they should be known as Graduates in Pharmacy, Pharmaceutical Chemists, or Doctors of Pharmacy—may it not be well for us as merchants to turn our attention to a practical phase of the educational question, not troubling so much as to what the graduates of the schools may be called, but trying to devise means to real improvement in the merits of the men we are asked to receive as clerks and assistants?

Within the last few months I have taken pains to inquire somewhat at length as to the opinions held by employers with regard to the relative efficiency of Graduates in Pharmacy compared with young men not graduates, but who have received good practical experience in stores. I have been surprised to find that where the business consists largely in the sale of proprietary articles, goods of home manufacture, toilet articles and domestic remedies, the latter class were so frequently preferred. In many instances proprietors of such stores spoke in favor of graduates, but very often I received an expression of preference for men who have acquired their training outside of colleges. This Association would be astonished to find, on investigation, such a strong and growing feeling among some of our most successful druggists adverse to graduates.

It has been recently stated in pharmaceutical journals that there is a sentiment fast gaining force in favor of abolishing "experience" requirements, and those holding this opinion attempt to fortify their position by the statement that this requirement is really no test of the graduates ability and attainments, but is often much abused and inadequately applied. It is also argued that while store experience is essential to the pharmacist's equipment, this requirement is entirely beyond the province of the college to measure, and should be left entirely to the Boards of Pharmacy for valua-

tion ; that the duty of the college is to teach and examine its students, and to ascertain whether they profit from this teaching ; that it has no opportunity and is unable to judge of the value of the training received outside of its doors ; that it makes no difference how long it has taken a man to get his training, if he only has enough.

For my part, I maintain that this sentiment is radically wrong. The colleges should not only demand that their graduates shall have four years' practical experience, but they should also ascertain that it is the right kind of experience, by every approved method of testing knowledge ; and, in addition, supplement this experience with such examples and instructions as will fix and increase practical efficiency ; that not enough stress is laid upon practical experience, and too much given to theoretical matters, which in some instances could be modified as to extent, and often profitably curtailed or even dispensed with.

Whatever may be the fate of the cut-rate method, whether it shall survive and continue to occupy a distinct place in the pharmacy field of the future, or go down in the contests that may be waged against it (and disavowing any desire to raise any such discussion here), we cannot close our eyes to the fact that the few who began this business in 1884 have grown to a large number, and a practical knowledge of the various matters pertaining to this style of business possessed by our graduates, would go far to settle the vexed question, bringing out its preserving merits or displaying its evils.

Far be it from me to underestimate or decry the great service done to the drug business in the United States by the Colleges of Pharmacy. I offer in a humble way several suggestions that, if adopted (even greatly modified), would, in my opinion, enhance the efficiency of graduates of pharmacy in these times of close competition. If it should come to pass, as predicted by some, that the drug business in our country will soon be divided into several grades, one of which will be only for the compounding of prescriptions and the sale of physicians' requirements, and another, for instance, where the functions of the bacteriologist and analyst will be fulfilled, then the method of instruction as it now exists in the colleges will be all that is necessary ; but until that happens, all the practical information that can be possibly imparted to the student should be given him.

A large number of graduates of colleges never become proprietors, but act as clerks and assistants to others. It is apparent that it should be the business of a college to so fit these men that they shall be as valuable as possible to their employers and themselves. In very few instances does one of these graduates so employed ever make use of his knowledge of many of the theoretical branches. Such knowledge is often forgotten by them in a short time. Hence, may it not be well contended that the teaching of such strictly theoretical branches should be brought down to a minimum?

On the other hand, special lectures could be given to the students by experts on a number of things which would be found useful in an every-day life. For instance, the Graduate in Pharmacy who is familiar with the successful manufacture of perfumes, who knows how to wash pomades, how to blend oils and essences, who can make a good cologne or extract, or compound a good toilet powder, or make smelling salts, sachet powder, and the hundreds of toilet requisites in the sale of which the profit largely goes to make up for the loss in selling patent medicines at close margins, would certainly be of much more value to an employer than one who is ignorant of these matters, and yet who might have gained distinction in his class in the theoretic and purely scientific branches of study. In every city where a College of Pharmacy is located, some perfumer could doubtless be found who would give practical lectures showing the main points to be observed in making these goods successfully, giving formulas where formulas were required, and outlining the work in detail.

In the past few years many druggists have found the sale of photographic material and supplies quite profitable. A clerk who could intelligently explain their uses to the increasing number of amateur "button pushers" would have a fair chance for an increased salary. In any of our large cities dealers or manufacturers of these supplies would gladly explain the uses of the materials from a business point of view, and give such data as may be required to exhibit and sell their goods to advantage.

I know of nothing handled in the drug store that affords more profit than the sale of trusses, elastic stockings, abdominal supporters and articles of a similar character, yet comparatively few of these appliances are sold in drug stores. Specialists who charge exhorbitant prices fit by far the most of them. Any manufacturer of these appliances would gladly give the desired instructions as to the proper adjustment of them, and how to repair occurring slight defects.

The clerk who is able to manage the advertising department of a store will certainly receive a larger salary than one who is unable to do this, and it would be an easy matter in the large cities where colleges are situated to have one or more special lectures during the session from such advertising experts as Bates, Fowler, Powers, or one of a dozen others who are known over all the country as expert writers of advertisements. In such lectures not only the method of writing advertisements could be entered into, but also that important little matter of proof-reading could be taught.

Again, the clerk who is able to present an attractive show window, changing it weekly or semi-monthly as the occasion may require, would certainly be of more benefit to his employer than one who has no knowledge or taste in that direction. In every city where there is a College of Pharmacy, you will be able to find one or more men engaged by the larger general stores at salaries that few Graduates in Pharmacy receive, who would, doubtless, take pleasure in practically demonstrating before the class how windows or show-cases could be dressed to the best advantage.

Many more instances might be mentioned where special lectures could be profitably given to a class—lectures pertaining to every day happenings in a drug store, to matters that unfortunately so many druggists and drug clerks overlook. For instance, manufacturers of labels, boxes and cartoons would vie with each other for the privilege of lecturing before the young men on how labels and circulars are devised, or should be devised, and on the differences, not only in quality, but in the styles of boxes, labels, etc., pertaining to the drug business. The same might be said of manufacturers of shop furniture or fixtures, and the same applies to the manufacturer of soda water apparatus and supplies.

Instead of agreeing with the sentiment mentioned, of abolishing the experience requirement, I trust some day to see a College of Pharmacy located in one of the larger cities of the United States where a practical store will be in operation, where the young men will be taught how to put up prescriptions behind the prescription counter, where catch prescriptions will be written and practical observation taken by some graduate in charge who is a practical man, where the dressing of windows and of showcases and the manufacture of toilet articles will be taught, and instruction given how to prepare neat and salable forms of domestic and household remedies. When this is done, good work will solve many of the problems of "hard times." Thus let the opportunity be afforded to every graduate turned out from our school, either to make a success of his own business, or to be of sufficient value to his employer to command a salary far above that which is paid to the average graduate at the present time.

I wish to be fully understood as in no way depreciating the value of true and accurate pharmaceutical knowledge and skill. This field of labor is one full of goodly fruit for beneficence to its possessor, and to humanity; but I would strongly inveigh against our colleges sending out mere theorists, without the ability for practical work in the real domains of their future labor, the drug stores of our land.

We want men who are capable of ascertaining and supplying all of the myriad medicinal needs of a sick and suffering humanity, with dispatch and intelligent accuracy, and with profit to themselves and their employers, and not merely men with heads full only of the technical terms and the theoretical part of our science; men who, while blessing their community, may acquire a competency or a fortune, and not such as may call forth and justify the satire of the poet when he sang:

> "Poor human bodies are such fools,
> For all their colleges and schools."

On motion, the paper was received and referred to the Publication Committee.

MR. HALLBERG: I wish to say also that in seconding that motion, I cannot let that paper be referred without having a word to say on the subject. That paper points the

way, and without desiring to say anything in favor of the institution I am connected with, I want to say that is the idea that governs the institution with which I am connected. We always endeavor to present the practical bearings of the subjects of pharmacy, and it is only an institution where all the teachers are pharmacists, which can do this. In institutions where there is but one pharmacist, and all the other teachers are scientific men of theories, of course they are at a decided disadvantage, and turn out the kind of men that Mr. Jacobs refers to.

MR. HURTY: One question. The gentleman creates the impression that he believes there is antagonism existing between practice and theory. Mr. Hallberg also creates the impression that that is the belief in general. I am sure that there is no antagonism between practice and theory. They are as inseparable as the Siamese twins. They are connected together, and the man who tries to be practical without being theoretical will fail; the man who tries to be theoretical without being practical cannot do so. They are united firmly. Now the idea of antagonism has gone forth in this world, and some of the greatest teachers of the world, Huxley and others, tried to show the world that that is a false notion, there is no antagonism. I would like to impress that point, and say emphatically there is no antagonism.

MR. MAYO: Allow me to make an explanation that Mr. Jacobs from modesty might not care to make. I think Mr. Hurty is too much of a friend of practical pharmacy. Whenever any one says, "practical pharmacist," Mr. Hurty objects. Mr. Jacobs when he graduated took a very high standing in his class, and took one or two, two I believe, of the highest prizes. He was decidedly a prize man. His successful commercial career is an illustration of that. I am quite sure that his career is the best illustration that he thinks that theoretical knowledge and practical ability are compatible.

MR. SAYRE: I want to second the remarks made by Mr. Hallberg, and if there is any deficiency in the curriculum of the institution that I represent, I want the Association's help and Mr. Hallberg's help. I understand we are here working to a common end, to help me to bring about the very conditions that are asked for in this paper. I heartily endorse the practical side. He knows perfectly well that I am heartily in favor of this, and I ask that this Association, this Section on Legislation and Prof. Hallberg, aid me in bringing about as near in the future as possible, the very condition that he is asking for. We have as much of the practical side as we can give, but we haven't the drug-store, we haven't the lecture on trusses, and the lecture on advertising; but it may be that with your aid we will have after a time all of these appliances.

DR. WHELPLEY: I would like to say that the only way to get a thing is to go after it and not wait to be forced into it.

MR. SAYRE: I don't ask for enforcement. The only question is help.

A paper by Prof. Sayre was then read, entitled "Scholarships."

SCHOLARSHIPS.

BY L. E. SAYRE.

At the last meeting of this Association, the president in his excellent address made some suggestions regarding this subject of scholarships, which I fear were passed over too lightly, and for want of time and certain interruptions, did not attract the attention of the Association at large. The suggestion was to establish a scholarship fund of fifteen hundred dollars annually, for the purpose of securing to suitable candidates the

advantage of higher education in pharmacy. After mentioning the qualifications to be required of such a candidate, the stipulation was that he should present to the Examining Board (which should consist of certain officers of this Association), an original paper involving the results of personal observation or experience in some department of investigation of value to pharmacy. The candidate should be chosen by the Association and each State Association. Examinations should be held annually. The successful candidate should be sent to some desirable Continental school or University, where he could secure during three years the highest training in synthetic chemistry, plant analysis, and manufacturing pharmaceutical processes. An annual report of his work should be submitted to this Association, embracing a resume of the year's instruction, the methods of instruction employed, and an account of original work personally performed. On his return he should identify himself with this Association, presenting each year for two years an original paper for publication in the Proceedings. This is the substance of the suggestions of our former President. (See Proceedings 1894, pp. 9, 10.)

The Committee on the President's Address, of which the writer was a member, referring to this suggestion, reported: "While in full sympathy with the spirit that prompted the recommendation, and appreciating the high ideal of pharmacy calling it forth, yet we believe that, irrespective of other considerations, the financial condition of our Association will not warrant its assuming the responsibility which the establishment of such a scholarship would involve, and, therefore, cannot recommend its adoption." The attention of the Association being so engaged with other matters, as before stated, unfortunately little time was given for discussion of such a topic, therefore I have thought it well to refer to it at this time; and, while it may not be considered wise to act upon the valuable suggestions referred to *at once*, I desire to keep them before the Association, and again call attention to the importance of so praiseworthy an undertaking as these suggestions proposed, and I do this in face of the charge, which has perhaps justly been made, that our Association is merely a battle-ground for such ideas. I trust, however, as does the author of this charge, that something will be accomplished. If I read aright, I believe the pharmacists who are looking wisely to the future realize the necessity of higher education, since several worthy articles have appeared in pharmaceutical journals bearing upon the subject, and I hope the result will be that something will be done besides writing or talking about it. To-day we are constantly asking ourselves, Who can tell us what shall be done with the present conditions confronting the profession of pharmacy? These conditions are familiar to every one; the picture need not be drawn, it is one of strife and tumult. To whom among those now engrossed in the care and struggles of this strife can we go for direction and advice? There is a feeling on the part of many who have been carefully studying the subject that higher

education is in some way connected with the future progress of the profession. I confess, when I look seriously into the future, I share this opinion, and I feel that this Association should see to it that steps, in the near future, are taken to raise the tone of pharmaceutical education, and that we are constantly raising up in our midst a class who are thoroughly competent to do the higher work for which our profession is constantly asking —a class who shall not be obliged to struggle for existence in the field already overstocked, but, aside from its tension and overpressure, be able to maintain a position in the profession, have leisure to study and point out the way of progress, while teaching how best to cope with existing circumstances.

Much has been said regarding the objection of aids to individual students; that these tend to pauperize, to make the student lose his grip, as it were to weaken self-dependence, as in the case of a pensioner. This position is emphasized by those who claim to view such matters from the standpoint of business rather than sentiment. They tell us that the new charity of to-day forbids that a man shall give doles to beggars without satisfying himself personally, or through some agency to that end, that the gift will do good and not harm to the recipient. In some individual cases, doubtless, such harm may be done; but the cases are rare, and certainly such individuals are not contemplated in bestowal of fellowships. I am willing to join hands with those who expect some definite return; there are many reasons, perhaps, for advocating a system by which at least a partial return of the money thus granted should be expected, if it were not strictly demanded. When the sense of moral obligation to do this does not exist, an attempt might well be made to create it. In my experience I have found that those who were helped by scholarships were young men of neither wealth nor excessive poverty; they have mostly been those whose means have been taxed well toward, if not beyond, their limit by expenses in college. Merit, not poverty, has been the basis of choice; and consequently such as demonstrated their intellectual superiority, whose intellect has been far beyond that of mediocrity, who have the capacity for competing for leadership in some department, have been chosen. Such, I take it, is the meaning of our former President when he refers to the scholarships of this Association.

It would be hard to say what would have become of learning had it not had from the beginning the benefit of endowment. Education has not followed solely the law of supply and demand.

The comparative practical value of graduates and licentiates is more or less sublimely expressed by a non-graduate in a recent issue of one of our periodicals, when he says: "I feel certain that the licentiate is by far the better clerk, for the following reasons: The college graduate has experience in certain kinds of work pertaining to the pharmaceutical department only: whereas the coming drug clerk and the majority of the clerks

needed are what might be called all-round men—druggists, stock clerks, and salesmen—to suit the mercantile tendency to which the drug store of to-day seems to be drifting, as evidenced by the sale of lamps, cigars, candy, seeds, soda water, and many other articles foreign to legitimate pharmacy. How rarely do we find the above mentioned qualities in the graduate?

"The graduate having had enough money to attend college, has learned to think that he has studied a genteel profession or trade; a practical application of the requirements of the day is therefore below his idea or inclination.

"The licentiate is a man, as a rule, who has to support himself and get his own education, and who is ambitious."

For myself, I certainly do not wish to underestimate the value of the brilliant young man who has made his mark in any direction in the trade or the profession. Some have done this in spite of many disadvantages, but they are the exceptions. As a rule the ambitious licentiate is superficial, and impresses us with the truth of the saying: "A little learning is a dangerous thing," and that it does not beget an excessive amount of modesty. These are they, we are told, who are filling the ranks of the profession to-day. These are they, shall we say, who are shaping the destiny of the pharmaceutical profession. If the Pharmacopœia of the future is to take an advanced position, we certainly cannot look to this source for aid to this end. We are sadly in need to-day of men who have a deeper insight into the sciences of their profession; scientists whose minds are trained like a good lens to bring knowledge to a sharp focus in the cause of pharmacy. The revision of the Pharmacopœia has emphasized the fact that we are in need of advanced workmen everywhere in pharmacognosy and the various lines of pharmaceutical chemistry. It seems to me that this American Pharmaceutical Association, in a practical way, could aid very materially in this direction if it would take immediate steps toward creating a fellowship substantially as proposed by our former President. This section at least might co-operate with the various colleges and State Boards of Pharmacy, and secure such a fund as would carry out the provisions of the measure. The prizes of the Association might well be converted into fellowships, and its influence upon the colleges might well be directed to the same end. A foreign fellowship need not of necessity be be given; a home fellowship. it is to be hoped, in the near future, will be desirable. But a foreign fellowship is the most feasible way of importing new ideas: periodicals do not do this. The ideas must not only be imported, but become a part of us. When I think of the immense advantage which, in time, would undoubtedly accrue from such a plan I become more than anxious that such a body as our Association should adopt it; and I join with Dr. Kremers in saying it is a pity that we have not now a dozen energetic and educated young men all over the world, reaping annually great harvests for the American Pharmaceutical Association and

for American Pharmacy. Here is an excellent opportunity, and let us hope that this national organization will take the lead. When it does, I am sure it will have a good following and support.

Lawrence, Kansas, Aug. 1, 1895.

On motion the paper of Prof. Sayre was received and referred to the Publication Committee.

MR. OLDBERG: I move that a special committee of three be appointed by the Chair to consider the recommendations made in Prof. Sayre's paper, and to report at the next annual meeting on the feasibility of carrying out the recommendations.

Seconded and carried

A paper by Prof. J. H. Beal, entitled "College Attendance" in answer to Query No. 8, in the circular letter issued by the Association; and also a paper by the same author, entitled "Pharmacy Board Regulation," in answer to Queries 10 to 14 of said circular letter, were thereupon read by title, and on motion were referred to the Publication Committee.

A paper by Prof. Bartley, entitled "Pharmaceutical Degrees, what shall they mean?" was on motion read by title, received and referred to the Publication Committee.

A paper by Prof. Fennel, entitled "Adulteration of Drugs, Laws for the Prevention of," was on motion read by title, received and referred to the Publication Committee.

A paper by Prof. Kremers, entitled "The Position of the American Pharmaceutical Association toward Pharmaceutical Education," was on motion read by title, received and referred to the Publication Committee.

A paper entitled "Registration Requirements of American Pharmacy Laws," by Prof. Beal, was on motion read by title, received and referred to the Publication Committee.

(The text of the papers read by title will appear in full at the end of the Minutes of this Section.)

A paper on "The Metric System," by Mr. R. A. Sauerhering, was presented by Prof. Hallberg, who read in full the resolutions attached to the paper. The following is the complete text of the paper:

THE METRIC SYSTEM, ITS INTRODUCTION AND PROGRESS.

BY R. A. SAUERHERING, OF MAYVILLE, WIS.

At this present year, 1895, just one hundred years have elapsed since the then-existing standards of weights and measures in France were radically changed by the adoption of the metric system of weights and measures by the French National Convention in 1795.

The Academy of Sciences of France has ever afterwards put forth great efforts to have this beneficent system introduced in and adopted by all nations, to establish a uniform system of weights and measures for them all, that thereby all nations may become a unit on this important matter.

At the meeting of the Academy of Sciences in Paris, 1799, joined by delegates from Spain, Italy, Denmark, The Netherlands, and Switzerland, two reports on the metric system were made to the class, one by Tralles, of the Helvetic Confederation, and the other by Van Swinden, of the Netherlands. These reports, combined in one by Van Swinden, were then reported to the general meeting of the Academy, and by that body solemnly presented to the two branches of the National Assembly, on June 22, 1799, together with a definitive metre of platina made by Lenoir, and a kilogramme of the same metal made by Fortin.

The report was adopted by the National Assembly with great enthusiasm, and the expression of feelings that the genius, the science, the skill and power of great federated nations are seen joining hand in hand in the true spirit of fraternal equality.

For many years after this memorable convention, the nations of Europe were shaken to their foundation by politicul disturbances, which excluded any international progress in this peaceful, but important matter.

In the year 1869, with a view to the construction of more perfect and uniform standards, and the distribution to different countries, an International Commission of weights and measures, composed of scientific representatives of all civilized nations, was formed to meet at Paris.

At the first meeting of this Commission, held in Paris 1872, the new prototypes of the new standards of weights and measures were decided upon.

The first convention of the general conference for weights and measures, composed of the representatives of the United States, Germany, Austria, Hungary, Belgium, Brazil, Argentine Confederation, Denmark, Spain, France, Italy, Peru, Portugal, Russia, Sweden and Norway, Switzerland, Turkey, and Venezuela, (Great Britain not represented), assembled at Paris in 1875. At this convention the new prototypes of the standards of weight and measures, as previously decided upon, were formally sanctioned, and this convention further decided to establish and maintain, at the common proportionate expense of all the Governments represented, a bureau of weights and measures, to be located in Paris. This bureau to be under the exclusive direction of the International Committee of weights and measures, which latter body shall be under the control of a general conference for weights and measures composed of the delegates of all the contracting Governments.

This convention or general conference concluded its labors and deliberations and signed the treaty the 20th day of May, 1875, which treaty was advised by the United States Senate for ratification 18th May, 1878, ratified May 18, 1878, and proclaimed by the President of the United States, September 27th, 1878.

By the published proceedings of the International Committee of weights and measures, held at Paris 1884, the following Governments are reported to have adopted, in full or only partially, the metric system, viz.:

Adopted and made obligatory by Germany, Austria, Hungary, Belgium, Argentine Republic, Spain, France, Italy, Peru, Portugal, Roumania, Servia, Sweden and Norway, Switzerland, Venezuela, and Japan ; legalized, but the use optional, by Great Britain and Ireland and its posssesions, the United States, Turkey, and later adopted by Denmark and Greece ; not legalized by Russia.

We thus see that, with few exceptions, the metric system of weights and measures is in use by all nations of the European Continent and their possessions, and by the other American Governments ; only Great Britain and the United States, the two English-speaking nations, hold themselves aloof from the long column of metric-system-using Governments.

Great Britain legalized the optional use of the metric system of weights and measures in 1864, and that system is now used in Great Britain in the trade transactions with metric-using nations, by literary and scientific Association and other Associations.

By a late report of the Select Committee of the House of Commons, appointed February 3, 1895, we observe that after a very far reaching and vigorous investigation by said Committee, the same have come to the conclusion, adopted 6 to 2 by the Committee, that the adoption, and after two years, the compulsory use of the metric system of weights and measures in Great Britain and its possessions would greatly result to the benefit of the people ; at the close of the report the Committee made the following recommendations :

1. That the use of metric system of weights and measures be at once legalized for all purposes.

2. That after a lapse of two years the metrical system be rendered compulsory by Act of Parliment.

3. That the metrical system of weight and measures be taught in all public elementary schools as a necessary and integral part of arithmetic, and that decimals be introduced at an earlier period of the school curriculum than is the case at present.

Dated July 1, 1895.

Read in the House of Commons and ordered printed—proving that we can hope that Great Britain will join the long roll of nations, who have adopted and exclusively use in the metric system of weights and measures, which then would leave the United States isolated on this important matter.

In the United States as early as 1821, Mr. John Quincy Adams, then the Secretary of State, made the following extract from the report to the House of Representatives :

Perhaps when the spirit that urges to the improvement of the social condition of man, shall have made further progress against the passions with which it is bound, and by which it is trammeled, then may be the time for reviving and extending that generous and truly benevolent proposal of the constituent National Assembly of France, and to call for

a concert of civilized nations to establish one uniform system of weights and measures for them all.

The Hon. John A. Kasson, Chairman of the Congressional Committee of Coinage, Weights and Measures, made a flattering report of the benefit to the people by the adoption of the metric system, to the House of Representatives of the 39th Congress in 1865. And in 1878 the Hon. Alex. H. Stephens, in his report to the House of Representatives of the 45th Congress, on coinage, weights and measures, used the following expressions:

> We are irresistibly led to the conclusion, that the metric system of weights and measures is destined to become, in the near future, universal among all civilized nations of the world. Its adoption in the United States, and its obligatory use in all the government departments, is believed by many to be a fixed fact, at no very distant day.

The metric system was legalized by the United States in 1866, and is now in use in the United States marine hospital service, in the foreign business of the post-office, in the United States coast and geodetic survey, in the United States Pharmacopœia, and to some extent in the geological survey, the Mississippi river survey, the international weather charts and bulletins of the United States signal service, in reports of the United States census of 1880, and almost exclusively used in chemistry and many other sciences. It was also urgently recommended by the late James G. Blaine, then Secretary of State, in his letter transmitted to Congress by the President, July 10, 1890.

We thus can observe that the metric system is working its own introduction and use, without much material aid, by its merits and benefits derived therefrom, and we may be justified in the hope that the people of the United States will add one more centinary celebration, which does interest the whole civilized world, by having Congress speedily pass a law making the exclusive use of the metric system of weights and measures in the Customs service of the United States obligatory, and thereby smoothing the road for the general adoption and use of that system in all transactions at the end of this century.

The following resolutions are offered for deliberation:

Resolved, That it is the sense of the American Pharmaceutical Association, that the general adoption and use of the metric system of weights and measures in the United States is very desirable, and would prove a great benefit to the people, that our trade relations with other nations would be stimulated by the unity of weights and measures, and that this Association will join hand in hand with the American Metrological Society and other societies in efforts to accomplish this unity; and,

Resolved, That the President of the American Pharmaceutical Association is hereby authorized and respectfully requested to appoint a committee, consisting of one member of each State Pharmaceutical Association, whose duty shall be,

1. To work in conjunction with the American Metrological Society and other societies in petitioning Congress to pass a law that on and after July 1, 1896, the metric system of weights and measures, authorized by the Act of Congress approved July 28, 1866, shall

be used exclusively in the Customs service of the United States; and that on and after July 1, 1900, the use of the metric system of weights and measures shall be compulsory in the United States in all trades and transactions where weights or measures or both are used.

2. And to accelerate the passage of such law by Congress, it shall be the duty of each of the committee members to communicate with one pharmacist in each congressional district in his State, and request him to endeavor to interest every pharmacist and other like-minded men in his district to sign the petition to Congress, sad mail the same to his Representative; and further,

Resolved, That each State Pharmaceutical Association is hereby requested to have the necessary number of petitions to Congress printed and sent to its member appointed as aforesaid, who will distribute the same as indicated above, as soon as convenient, and if possible in time that the next Congress at the next (the first) session, may act on the same.

FORM OF PETITION TO CONGRESS.

To the Honorable the Senate and House of Representative of the United States, in Congress assembled:

The undersigned respectfully prays your honorable body to make the following enactment, which, except for the postponement of five years in the date of its going into effect, is the same which was submitted for the consideration of the 51st Congress by the Secretary of State, in his letter transmitted to Congress by the President, July 10, 1890.

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled:

That on and after July 1, 1896, the Metric System of Weights and Measures, authorized by the act of Congress approved July 28, 1866, shall be used exclusively in the Customs service of the United States.

And that on and after July 1, 1900, the use of the Metric System of Weights and Measures shall be compulsory in the United States, in all trades and transactions, where weights or measures or both are used, in place of the weights and measures now used in the United States.

On motion of Dr. McGill, the paper was received and referred to the Publication Committee.

Mr. Oldberg moved that the resolution attached to the paper of Mr. Sauerhering, in reference to the adoption of the metric system, be recommended to the last General Session of the Association for adoption, and that the resolution, also attached, in reference to the Status of Pharmacists in the Army and Navy, be referred to the present Committee on that interest.

The motion was seconded.

THE CHAIRMAN: It occurs to me that it is hardly worth while for us to recommend a thing that cannot possibly be adopted, and that is the enforcement of the law making the metric system compulsory on and after 1900. It is a practical impossibility to bring about the revolution in trade which will admit of that. It took the French forty years before they found it possible to make a compulsory law.

MR. OLDBERG: The object of the resolution is the moral effect it will have; it will show what the tendency is. It will have the same effect to fix the date in 1900 as 1950. The metric system is in a fair way of being adopted in England, and I think it will in time be adopted in this country.

MR. DEPEYRE: In France they passed such a law, and after a few years no Frenchman would go back to the old system.

MR. ALPERS: I cannot see any objection to the adoption of this resolution for the same reason. I well remember the time when the metric system was introduced in Germany. The law was passed there that from a certain day everything should go on in the metric system. Of course there was a certain amount of contention. I remember well that in school we were taught nothing else from morning to night but the metric system, but it went down after a couple of weeks, and that was the end of it. There was no stoppage of trade or commerce of any kind, but there was a good deal of bad talk.

MRS. MINER: I believe our country is getting ready for this system. I can speak for the schools of Kansas. I believe every school in Kansas is now familiar with the metric system. That is one for its adoption.

The motion was carried.

The Chair appointed as the Committee to report on the paper of Prof. Sayre, entitled "Scholarships," Messrs. Hallberg, Sayre and Ebert.

The next order of business was the installation of the newly-elected officers.

In introducing the newly-elected Chairman, Prof. Hallberg, Chairman Good spoke as follows:

"It is a simple matter for me to introduce the newly-elected Chairman of this Section, Prof. Hallberg. In introducing him I want simply to say that if he brings to bear the same amount of industry on this Section in the year to come that he devoted to it in the year past as Secretary, we may hope for some objects to be accomplished without doubt, and we trust that they will be of good effect. I introduce to you the newly-elected Chairman, Mr. Hallberg."

MR. HALLBERG: Mr. Chairman and Fellow Members: You know I am not at all fond of making a speech, and cannot make any remarks when I am in the present position; so I will simply say that I will endeavor, with your aid and the aid of my confreres generally, to continue the work that we have begun this year, and try to carry it on systematically. I have always felt that in this great vast country with forty odd pharmacy laws it is necessary that we must know "where we are at," and I think it will take two or three years to acquire the necessary information, and get it in proper shape, so that it will serve as a basis for future work. I thank you.

At the request of Mr. Good, Messrs. Oldberg and Kauffman conducted the newly-elected Secretary (Prof. Beal) to the platform.

THE CHAIRMAN: You had evidence of the industry of our associate for the past year, and you know what to expect for the succeeding year.

MR. BEAL: I thank you for the honor you have conferred upon me, and it has been unexpected and undesired, I might say, because I feel the importance of the position and of my incompetency to fill it. I am from Ohio, and Ohio men naturally dislike to hold office.

CHAIRMAN HALLBERG: I desire to say that the Secretary and myself have selected as associate for the ensuing year Mr. H. M. Whitney, the President of the Massachusetts State Board of Pharmacy.

MR. GOOD: Mr. Whitney is not present.

MR. OLDBERG: I wish to move a vote of thanks for the excellent work of our retiring Chairman, for the ability with which he has faithfully filled his duties.

Seconded.

MR. GOOD: Mr. Chairman, I thank Prof. Oldberg very much, but I hardly think I should be singled out of the three for a special vote of thanks. It would have been impossible for me to have done as much as I have without the very able co-operation and industry of my two associates.

MR. OLDBERG: I wish to say to Professor Good that it was my intention to move a vote of thanks to the several officers, and I prefer to have it so now.

The motion of Prof. Oldberg was put and carried.

MR. OLDBERG: I now move a vote of thanks for the industry and ability with which the several officers of this Section have filled their positions during the past year, and I especially wish to call attention to the fact that the Secretary of the Section has bestowed a great deal of painstaking labor.

CHAIRMAN HALLBERG: With all due deference to Prof. Oldberg, you cannot move a vote of thanks to officers that do not retire, but simply change their places, and I think that it is a good deal like trying to swap horses (with a hold on the string). I do not like to entertain this motion. I hope that this vote of thanks will be postponed until next year. If there is no objection I shall postpone it.

(Cries of "Question.")

MR. HALLBERG: Then I will ask the retiring Chairman to put the motion. I am too modest.

Upon the motion being put by Prof. Good, the same was unanimously carried; for which Chairman Hallberg tendered his thanks to the Section.

MR. SAYRE: I have a motion in mind which I would like to make; perhaps it should have come earlier. It may be that it should come before the General Session. It is with reference to the display we have here now of Colorado plants; and I would like to move a vote of thanks to Prof. Kochan for the exhibit here, and ask that he be requested to report to the Secretary of the Association the names of the plants on exhibition, to be published in our coming report.

This was unanimously carried.

Upon motion the minutes of this session were approved without reading.

The Section then adjourned until the next annual meeting of the Association.

OUTLINE OF A COURSE IN PHARMACY LEADING TO THE DEGREE OF GRADUATE IN PHARMACY.

BY ALFRED R. L. DOHME.

1. *Preliminary Education**—Equivalent to the entrance examination of a city high school, and must include arithmetic, algebra, history, geography, proficiency in orthography, English grammar, elementary Latin and, if possible, German.

2. *Course of Lectures and Laboratory Work,* as detailed below, covering two courses of seven months each spread over two years, said courses to extend from October 1st to May 1st.

COURSE OF THE FIRST YEAR, OR JUNIOR COURSE.

Lectures:

(*a*) Chemistry—five hours weekly—inorganic chemistry.

(*b*) Pharmacy—four hours weekly—simples.

(*c*) Materia medica—two hours weekly.

(*d*) Botany (structural)—two hours weekly.

(*e*) Microscopy and histology—one hour weekly.

(*f*) Physics, elementary—one hour weekly.

Laboratory Work:

(*a*) Chemistry—six hours weekly—experiments, illustrating lectures, apparatus, manipulation and qualitative analysis.

(*b*) Pharmacy—six hours weekly.

(*c*) Botany and materia medica, each, one and one-half hour weekly.

(*d*) Excursion to botanize or visit manufacturing establishments—once monthly.

SECOND YEAR, OR SENIOR COURSE.

Lectures:

(*a*) Chemistry—four hours weekly—organic chemistry.

(*b*) Pharmacy—three hours weekly—official preparations.

(*c*) Materia Medica—two hours weekly—including posology.

(*d*) Botany—two hours weekly—(systematic.)

(*e*) Pharmacognosy—three hours weekly.

(*f*) Pharmacology—one hour weekly.

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* These requirements are to be increased to be equivalent to the requirements for graduation from a city high school, but this can only be done gradually, as the immediate adoption would almost certainly keep all applicants out of most schools of pharmacy. (*Dohme.*)

Laboratory Work:

(*a*) Chemistry—six hours weekly—quantitative analysis and organic preparations.

(*b*) Pharmacy—six hours weekly—official preparations and compounding prescriptions.

(*c*) Pharmacognosy, materia medica and botany, including microscopy—four hours weekly.

3. *Examinations*—One intermediate at Christmas and one at the end of the course in each subject.

4. *Quiz*—Two hours weekly in all subjects, together, by quiz-master.

5. *Shop Experience*—No attendance at drug stores during this work. It is recommended to pursue this after receiving the degree and between sessions.

6. No age limit set to receiving diploma.

7. Before being allowed to become a registered clerk or open a drug store, the candidate must be twenty-one years of age, and must pass an examination before the State Board of Pharmacy, which, as the only legal authority vested with power to act, shall decide if the candidate is fit to practice his profession. Whether the State Board of Pharmacy will require four years or no practical experience in a drug store, remains for them as representatives of the State to decide in giving the license to the candidate. The degree of Graduate in Pharmacy represents only the education of the candidate, and in no way entitles him to practice his profession. This is as it should be.

POST-GRADUATE COURSE.

Leading to the degree of pharmaceutical chemist.

Requirements: One additional course of seven months, to include advanced work in the following branches:

(*a*) Chemistry—organic and inorganic chemistry advanced, with chemistry of food stuffs, forensic chemistry, and physiological chemistry.

(*b*) Pharmacy—official preparations of complex nature, pharmaceutical testing and assaying.

(*c*) Materia medica—advanced work and special work in determination of the quality and quantity of the adulterations of crude drugs.

(*d*) Pharmacology—advanced lectures with examination of some synthetic compounds.

(*e*) Pharmacognosy—advanced lectures and determination and isolation of the various components of several drugs.

(*f*) Elective—lectures on physiology, geology, mineralogy and analysis of soils and fertilizers.

OUTLINE OF A COURSE IN PHARMACY.

Submitted by the School of Pharmacy of the University of Michigan.

FOR THE DEGREE OF PHARMACEUTICAL CHEMIST.

1. Applicants for admission must be at least eighteen years of age.

2. Requirement for admission: Graduation from standard high schools or certificates of good standing in institutions of collegiate grade, or their equivalents.

3. Attendance on two courses of thirty-six (36) weeks each, comprising not less than four hundred (400) hours of lectures and recitations, and not less than seven hundred and fifty (750) hours laboratory instruction in each course, or a total of eight hundred (800) hours of lectures and recitations, and fifteen hundred (1500) hours laboratory instruction. This time to be divided among the following subjects as follows:

1st year, 36 weeks.

1st Sem., 18 weeks.

1. QUALITATIVE ANALYTICAL CHEMISTRY.

   Lectures and recitations, one hour daily, on chemical notation of metallic salts, reactions of acids and bases, solubilities, methods of separation, the writing of equations, and drill in synthetic operations. Oxidation and Reduction.

   Laboratory work four hours daily. Preliminary work in reaction of the bases and salts, followed by analysis of unknown mixtures both solid and liquid.

2. GENERAL CHEMISTRY.

   Experimental lectures and recitations one hour daily.

3. BOTANY—ORGANOGRAPHY.

   Lectures, recitations and laboratory work three or four hours per week. The study of roots, stems, leaves, flowers, fruits and seeds with fresh material at hand. Use of the dissecting microscope. Drawings and descriptions.

2d Sem., 18 weeks.

4. PHARMACY—THEORY AND PRACTICE.

   Illustrated lectures, recitations three times a week.

5. QUANTITATIVE ANALYSIS.

   Lectures and recitations twice a week. Laboratory work four hours daily. Specific gravities. Volumetric and gravimetric separations.

6. MICROSCOPY.

   Lectures and recitations two hours weekly. Laboratory work four hours weekly. Use of the compound microscope. Study of the cell and its contents. Tissue systems. Histological study of certain drugs and their adulterants. Examination of drugs found in market for purity. Methods of hardening, staining and embedding.

7. PHYSICS.

   Experimental lectures aud recitations four hours weekly.

2d year, 36 weeks.

1st Sem., 18 weeks.

8. ORGANIC CHEMISTRY.
Lectures and recitations five hours weekly.

9. PHARMACY—*Continued.*
Lectures and recitations one hour daily. Laboratory work four hours daily. Operative pharmacy. Minor operations. Manufacture of 150 representative preparations of the U. S. P. and National Formulary. Practical application of pharmacopœial tests. Compounding of difficult prescriptions.

10. MATERIA MEDICA.
Lectures and recitations three hours weekly. Pharmacology. Physiological action of drugs. Posology. Poisons and their antidotes. Prescription writing and reading.

11. PHARMACOGNOSY.
Laboratory work with recitations two hours weekly. Study of official crude drugs in whole as well as in powdered form for identity, purity, quality, etc.

2d Sem., 18 weeks.

12. CHEMICAL PHARMACOGNOSY.
Lectures and recitations four hours weekly. Study of the active constituents of drugs in groups, such as alkaloids, glucosides, resins, etc., as to source, methods of separation, tests for identity and purity, solubilities, etc. Plant analysis.

13. MATERIA MEDICA—*Continued.*
Two hours weekly.

14. ORGANIC ANALYSIS.
Lectures and recitations three hours weekly.
Laboratory work four hours daily. Drug assay. Plant analysis. Qualitative analysis of plant constituents. Toxicology, etc.

15. PHARMACOGNOSY—*Continued.*
Two hours weekly.

16. ORIGINAL INVESTIGATION.

Quizzes.—Experience proves that text-book work combined with supplementary lectures by the teacher is superior and more satisfactory than the lecture system alone. Students should be quizzed more or less daily by the teacher himself, if possible, rather than by a quiz-master.

Examinations.—Test examinations, both oral and written, should be held periodically throughout the course, say every 4–8 weeks, in addition to the finals at the end of each course.

Graduation.—Drug store experience shall not be required for graduation. The school can in no way ascertain the quality and extent of apprenticeship, therefore cannot intelligently assume any responsibility for it.

HIGHER DEGREE.

Bachelor of Science (in Pharmacy).

Requirements.—Two additional years of thirty-six weeks each, including the same number of hours of *lectures and recitations* and *laboratory work* as stated above, distributed among the following subjects: French, German, Mathematics, Geology, Advanced General Chemistry, Advanced

Pharmacy, Hygiene and Physiological Chemistry, Organic Chemistry, with elections in Combustions, Manufacture of Synthetical Compounds, Analysis of Foods, Water Analysis, Advanced Quantitative Analysis of Essential Oils, Toxicology, Sugar Analysis, etc. Experimental Research.

The School of Pharmacy of the University of Michigan has established a course of four years of study, leading to the degree of Bachelor of Science (in Pharmacy). The course of two years of study, leading to the degree of Pharmaceutical Chemist, is retained. In both courses the college year is of nine months, as it has been at Ann Arbor from the first. The degree of Bachelor of Science is given under the Faculty of the School of Pharmacy, and is placed strictly upon the same educational plane held by the degrees of science given under the Faculty of Literature, Science and the Arts in the same University It is stipulated that the new degree in pharmacy shall have the same requirements for admission to college that are in force for the degree of B. S. in general science, and the same obligatory college studies in English, German, French, Mathematics and Physics that are in force in the biological course for the degree of B. S. The college studies will also include all the work of the two years' course, with extended work in organic chemistry, botany, and in pharmacognosy. In addition, the elective branches will include work in the laboratories of pharmacology, physiological chemistry and bacteriology, or in manufacturing pharmacy and industrial chemistry, or in sanitary analysis, food analysis and drug assaying, according to the purposes of the student. It is not expected that a majority of pharmaceutical students will enter upon so extended a course ; but it has been found that certain students of pharmacy want a college course as long as that of the best medical colleges, and in fact remain in university studies four years, and even five years. Furthermore, there is a distinct demand for graduates of the training here specified.

LIST OF MOUNTED SPECIMENS OF ROCKY MOUNTAIN PLANTS.

DISPLAYED BY JNO. KOCHAN, DENVER, COLO.

Ranunculaceæ.

Aconitum Columbianum, Nutt. (Blue and white variety.)
Anemone patens, L. var. Nuttallii Gray.
Aquilegia cœrulea, James.
Caltha leptosepala, De Cand.
Cimicifuga racemosa, Nutt.
Clematis alpina, Miller var. occid.
Delphinium azureum, Michx.

Menispermaceæ.

Menispermum Canadensis, L.

Berberidaceæ.

Caulophyllum thalictroides, Michx.
Podophyllum peltatum, L.

Papaveraceæ.

Argemone platyceras, L. and O.
Chelidonium majus, L.
Sanguinaria Canadensis, L.

Fumariaceæ.

Corydalis aurea, Willd. var. occid. Engelm.

Capparidaceæ.

Cleome integrifolia, Torr. and Gray.

Caryophyllaceæ.

Silene antirrhina, L.

Malvaceæ.

Malvastrum coccineum, Gray.

Geraniaceæ.
Geranium cæspitosum, James.
Geranium maculatum, L.

Celastraceæ.
Euonymus atropurpureus, Jacq.

Anacardiaceæ.
Rhus glabra, L.
Rhus toxicodendron, L.

Polygalaceæ.
Polygala senega, L.

Leguminosæ.
Glycyrrhiza lepidota, Nutt.
Lupinus argenteus, Pursh.
Oxytropis Lamberti, Pursh.

Lobeliaceæ.
Lobelia syphilitica, L.

Ericaceæ.
Arctostaphylas Uva Ursi, Spreng.
Chimaphilla umbellata, Nutt.
Moneses uniflora, Gray.
Pyrola rotundifolia, L.
Pyrola secunda, L.

Primulaceæ.
Dodecatheon meadea, L.
Primula Parryi.

Apocynaceæ.
Apocynum androsæmifolium, L.
Apocynum cannabinum, L.

Asclepiadaceæ.
Asclepias speciosa, Torr.
Asclepias tuberosa, L.

Gentianaceæ.
Gentiana affinis, Grisch.
" heterosepala, Engelm.
" Parryi, Engelm.
Severtia peremus, L.

Polemoniaceæ.
Gilia aggregata, Spreng.

Hydrophyllaceæ.
Eriodictyon glutinosum.
Phacelia glandulosa, Nutt.

Borraginaceæ.
Mertensia Siberica, Don.

Convolvulaceæ.
Ipomœa leptophylla, Torr.

Solanaceæ.
Datura Stramonium, L.
Solanum Dulcamara, L.

Scrophulariaceæ.
Pedicularis Grœnlandica, Retz.
Pedicularis procera, Gray.
Penstemon azureum, White.
Penstemon glaucus, Graham.
Scrophularia nodosa, L.
Verbascum Thapsus, L.
Veronica officinalis, L.
Veronica Virginica, L.

Rosaceæ.
Holodiscus discolor, Maxim.
Potentilla fruticosa, L.
Prunus Virginiana, L.

Crassulaceæ.
Sedum rhodanthum, Gray.
Sedum stenopetalum, Pursh.

Hamamelaceæ.
Hamamelis Virginiana, L.

Onagraceæ.
Oenothera pinnatifida, Nutt.

Umbelliferæ.
Cicuta maculata, L.
Cymospterus glomeratus, Raf.
Fœniculum officinale, All.
Ligusticum filicinum.

Cornaceæ.
Cornus Canadensis, L.

Caprifoliaceæ.
Linnæa borealis, Gronov.
Sambucus Canadensis, L.
Viburnum Opulus, L.

Rubiaceæ.
Galium boreale, L.

Valerianaceæ.
Valeriana edulis, Nutt.
Valeriana sylvatica, Banks.

Compositæ.
Achillea Millefolium, L.
Anthemis arvensis, L.
Aplopappus Fremonti, Gray.
Arctium Lappa, L.
Arnica alpina, Olin.
Arnica cordifolia, Hook.
Arnica Foliosa, Nutt.
Arnica latifolia, Bong.
Arnica Parryi, Gray.
Artemisia frigida, Willd.
Atennaria dioica, Gaert.
Chrysanthemum Leucanthemum, L.

Cichorium Intybus, L.
Erigeron Canadensis, L.
Eupatorium perfoliatum, L.
Grindelia squarrosa, Dunal.
Solidago humilis, Pursh.
Tanacetum vulgaris, L.
Taraxacum officinale, Weber.

Orobranchaceæ.

Aphyllon multiflorum, Gray.

Labiatæ.

Hedeoma pulegioides, Pers.
Marrubium vulgaris, L.
Mentha Canadensis, L.
Mentha piperita, L.
Mentha viridis, L.
Monarda punctata, L.
Scutellaria galericulata, L.
Scutellaria lateriflora, L.

Nyctaginaceæ.

Abronia fragrans, Nutt.

Chenopodiaceæ.

Salsola Kali, L.

Phytolaccaceæ.

Phytolacca decandra, L.

Polygonaceæ.

Rumex crispus, L.
Rumex hymenosepala.

Aristolochiaceæ.

Aristolochia Serpentaria, L.

Euphorbiaceæ.

Stillingia sylvatica, L.

Urticaceæ.

Humulus lupulus, L., flower and fruit.

Orchidaceæ.

Cypripedium parviflorum, Salisb.
Cypripedium pubescens, Willd.

Iridaceæ.

Iris versicolor, L.

Liliaceæ.

Calochortus Gunnisoni, Wats.
Convallaria majalis, L.
Leucocrinum montanum, Nutt.
Veratrum Californicum.
Zygadenus Nuttallii, Gray.

COLLEGE ATTENDANCE.

BY J. H. BEAL, SCIO, O.

"Should Scholastic Education be required preliminary to entrance into Pharmaceutical Schools or Colleges? If so, in what degree is it practicable of enforcement? Should such education be a requirement for registration of Apprentices by the State Boards of Pharmacy preliminary to eligibility for examination as Assistants and Pharmacists?"

For convenience the question will be considered first as it relates to the colleges.

It is assumed that it was not intended by the author of the query to call in question the necessity of the possession of at least some degree of scholastic education by all matriculants in colleges of pharmacy, and that the gist of the query is contained in the proposition, "To what extent is it practicable of enforcement?" In this sense the query is accepted and an answer attempted.

The education afforded by a college of pharmacy (by which is understood any institution conferring pharmaceutical degrees) is a technical education. Technical education, to be thorough, presupposes as its foundation a sound preparatory or "Scholastic Education." It has been quite generally consented to that a preliminary education equivalent to that which may be obtained by the completion of a standard high school course is none too much to exact as the minimum requirement for admission to a college of pharmacy, provided such a requirement is, in the words of the

query, "practicable of enforcement." The extent to which it is capable of enforcement depends upon the extent to which it is applicable to existing conditions.

It is safe to say that the majority of young men now employed as drug clerks, if examined, would be found deficient in general education, at least when measured by the high school standard. Many of them, perhaps a majority, entered upon their present employment through financial considerations alone, and with no thought of making it a permanent occupation. Once in the business and useful to their employers through their familiarity with the routine duties of the store, the temptation to remain was great, and the years which should have been given up to attendance at the public school were devoted to wage-earning. It is from this class of men that the greater number of applicants for matriculation within the immediate future must be expected to come. Comparatively few of them are now in a position to discontiue their service in the store in order to complete their education at the public schools. Many of them have passed the age at which public school attendance is legal. The effect, then, of requiring that all matriculants at a college of pharmacy should be possessed of an education equivalent to that conferred by a high school course, would be to forever debar these persons from obtaining a scientific education in pharmacy. Very many of them are qualified to pursue a college course understandingly, and if admitted to such a privilege are capable of becoming highly successful pharmacists and of reflecting honor upon the profession. Even the dullest and least capable among them would be greatly profited by college attendance, even though they were incapable of successfully completing the course. Not only would they profit thereby as individuals, but the profession would be the gainer and the public better served, because served by a better educated body of men than it is at present. All of these interests, personal, public, and professional, demand that the way of the present generation of druggists' assistants to a better knowledge of the duties of their calling shall be made not more but less difficult, and would be adversely affected by a rule which would deny them this opportunity. The fact must be recognized that service in an average drug store supplies an experience which of itself is a valuable preparation for a college course. Certainly such a service is a very imperfect substitute for the systematic training of the high school, and can never entirely replace it; but it does nevertheless possess a distinct educational value, which, in the case of an intelligent and ambitious youth, will go far toward compensating for a lack of other advantages.

Evidently, then, an educational requirement for admission to pharmaceutical colleges is not at the present time practicable of enforcement to the extent of rigidly excluding all who have not had a high school education. It would not only work an injustice to those who entered as apprentices when no such requirement was in existence, but would occasion

positive injury to the public interest by preventing the better education of the coming generation of druggists.

If it would be unjust to enforce it against those who have already served an apprenticeship, what can be said of such a requirement as applied to those who seek admission to the college of pharmacy without the qualification of experience?

As to the latter class, the writer can see no good reason why they should not be required to give evidence of the possession of a general education equal to that required for high school graduation. The exception advocated in behalf of those already in apprenticeship is a concession made in recognition of the value of store experience as a preparation for college, and of the injustice of adopting a requirement of an *ex post facto* nature. These considerations do not apply in the case of those who have not yet entered upon their apprenticeship. The latter have no ground upon which to claim such an exemption, nor will they have a just cause of complaint if they are required to conform to a higher standard than is required of those who are already engaged in the business. (The various pharmacy acts at their adoption excepted from their provisions those already in business, otherwise they could never have been enacted into laws. In like manner, the colleges in reforming their entrance requirements should not neglect the rights of those who entered the business when other requirements were in operation.) In short, the writer would advocate the establishment of what, in current political phrase, might be termed a "double standard," one comparatively advanced, to be applied to those who come to the college of pharmacy without prior experience, and another and less rigorous requirement to be exacted of those who come possessed of such experience.

To prevent the abuse of the exception made in favor of those now engaged in the practice of pharmacy, the lower standard should have a time limit attached to it. Otherwise there would likely be a continuation of the line of illiterate apprentices. For this reason a date should be adopted after which no person, either with or without experience, would be eligible to admission into or graduation by a college of pharmacy without a preliminary education equal to a first-class high school course at least.

The year 1900 might very properly be fixed upon as the date when the high school standard should become binding upon all colleges and institutions teaching pharmacy. This would afford ample time for those now in business, who so desired, to complete a college course in pharmacy, for those not already in business to properly equip themselves for the advanced entrance requirement, for the weaker colleges and those located in the more backward portions of the country to prepare for the new order of things, and thus begin the new century with a new era in pharmaceutical education.

This action would, of course, not affect in the least the position of the

schools which already require a high school education for matriculation, or which might desire hereafter to make their entrance requirements still higher. The intent would be to fix a date when the high school standard shall become binding upon all, the least as well as the greatest, as the minimum entrance qualification.

THE BOARDS OF PHARMACY.

"Should such education be a requirement for registration of apprentices by the State Boards of Pharmacy preliminary to eligibility for examination as assistant and pharmacist?"

The general intelligence of a candidate, as well as his technical knowledge of pharmacy, is one of the factors which help to determine his fitness for registration. The law in most cases probably authorizes the Board only to inquire into the technical knowledge of the applicant, but it is doubtful whether any supreme court would sustain a *mandamus* to compel the issuance of a certificate to a man who should be found entirely deficient of a common education, even though he might be able to repeat the entire Pharmacopœia from memory. Undoubtedly the Board should consider the general as well as the special attaintments of applicants for registration.

The extent to which they should inquire into the candidate's general attainments would probably depend to a great degree upon the educational conditions prevailing in each particular state. It would obviously be improper to exact a standard of education of applicants much in advance of that possessed by those already registered, unless notice of the intention to do so should have been so long given as to afford opportunity for the registration of those already in the business who possess the qualifications in this respect which have been previously required. Nevertheless, there should be an attempt made to gradually raise the standard, with the aim of making it ultimately equal to that of the best colleges.

As to whether Boards should require registration of apprentices at the time of their entrance upon their apprenticeship, which has been advocated by some eminent pharmaceutical educators, and seems also to be contemplated by the present question, it may be said that under the existing laws of a majority of the states, they would have absolutely no authority for doing so. Nor does it seem to the writer necessary that they should have such authority. If they have the power to and will enforce a proper standard of general education at the same time that they determine the apprentice's knowledge of pharmacy, they will have accomplished every purpose that could be accomplished by the former method, and save the interference with private affairs which that method would necessitate.

REGISTRATION STATISTICS.

BY J. H. BEAL.

Answers to Queries 10 to 14 Inclusive.

A letter was mailed to the secretary of each pharmacy board in the United States requesting a copy of the pharmacy law of the state, the rules of the Board, and answers to questions 10 to 14 of the printed list of questions. Only twenty-five answers were received, a little more than half the number addressed. The incompleteness of the returns prevents anything like an accurate statistical report, though a digest of them may serve to show the general state of the laws upon the subjects covered by the questions.

10. "What states recognize more than one grade of Licentiates, and by what titles are the several grades distinguished? When two grades of Licentiates are recognized, what are the age requirements,

(*a*) For the higher or Pharmacist's grade?

(*b*) For the lower or Assistant's grade?"

The answers show that the recognition of two grades of licentiates is quite general. Six states out of twenty-five from which data were received issue but one grade of certificate. One state (Georgia) recognizes three grades, namely, Pharmacist, Apothecary, and Druggist. In one state (Conn.) the legal title of the licentiate is Licensed Pharmacist. In the remaining states the titles are generally Registered Pharmacist and Registered Assistant Pharmacist for the first and second grades respectively. In several states no particular official title is discoverable, either in the law or in the printed rules of the Board.

The age requirements are usually eighteen years for the lower or assistant's grade and twenty-one years for the pharmacist's grade. In several of the states the law does not prescribe the age of the licentiate, and an age requirement, if one exists, is fixed by rule of the Board of Pharmacy.

11. "In which states is it customary to present the same list of questions to candidates for both grades, the grade of certificate granted depending upon the percentage of correct answers returned by the candidate? What are the advantages and defects of this method?"

Thirteen out of twenty-five boards reply that they submit the same list of questions to applicants of both grades, making the grade of certificate issued to depend upon the percentage of correct answers returned. Thus, an applicant may fail to make the grade required for Registered Pharmacist, but may make the percentage required for Assistant Pharmacist, and be registered accordingly. All but one of the Boards using this plan speak favorably of it, and believe it superior to the plan of using separate lists of questions. Against the latter method they urge the fact that it is almost impossible to make a proper difference between the two lists of

questions, and argue that the answers to one list, selected from the questions which every one employed in a pharmacy ought to know, is sufficient to demonstrate the fitness of the candidate to receive either the first or second grade of certificate, or his unfitness for either.

12. "To what extent is it customary for Pharmacy Boards to require candidates to demonstrate by practical work their fitness for registration? Is it possible under existing circumstances to greatly extend the principle of practical examinations?"

Practical work, other than the identification of drugs and reading of prescriptions, is required in only a few states. Nearly all the boards admit the necessity of practical work as a means of determining a candidate's fitness for registration, but plead the fact that their limited financial resources and the obligation of holding their examinations in three or four cities in the state render such examinations impossible.

13. "Where experience is a requirement for graduation or registration, should a distinction be made between experience gained in a city pharmacy and that obtained in a country drug store, and what should be the ground for such distinction when made? Also to what extent, if any, should menial service in a drug store, unconnected with compounding, be taken as experience?"

The experience requirement ranges from nothing at all to two years for assistants and five years for registered pharmacists. In the majority of cases, three years is the requirement. In many States the law makes no provision as to the experience of the candidate, and the requirement, if one exists, is simply a rule of the Board. It is questionable whether the Boards in several of the States would under the existing law have the power to enforce such a requirement. But it is undoubtedly better to risk their power to do so than to admit all who might suceeed in answering a certain per cent. of the questions, without regard to experience.

In only a few cases where experience is required is any distinction made as to the kind, and then only to the extent of requiring that it shall be in a store where prescriptions are compounded, the character of the work done by the candidate not being specified.

Scio, Ohio, July 1, 1895.

THE POSITION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION TOWARD PHARMACEUTICAL EDUCATION.

BY EDWARD KREMERS.

At no time during the entire history of pharmaceutical education of this country have greater strides been made toward reform than during the past few years. Hardly a college or school of pharmacy within the entire length and breadth of this country, which has not only announced improvements in its courses, if not in requirements at least in degrees to be conferred. Traditions of the past have been thoroughly ventilated. Conditions have changed, and with the change of conditions the *raison d' être*

of the requirements of well nigh colonial days have vanished. Institutions that were founded by "impractical" university teachers have proven their right of existence to such an extent that those who criticised them in former days, though still ostensibly maintaining their earlier ground, are in reality undermining their own foundation by silently accepting the ground of their supposed opponents. A quiet revolution is taking place while the attention of the pharmaceutical public is being held by the sound of brass and tinkling cymbals. There is a great stir about the guinea's stamp —here graduate, there doctor—and the clatter of intellectual arms, of the pen and the printer's press, is so deafening that he who does not dive beneath the surface of this commotion must have experienced the truth of the adage: "Es wird mir bei alle dem so dumm als ging mir ein Mühlrad im Kopf herum." The arguments designed to attract the multitude, and based on dollars and cents, will not stand the test in the crucible of experience. The assaying historian will remove the slags from the baser metals until there remains nothing but the regulus of the nobler ones. He will smile at the confusion of pharmaceutical degrees, cast them aside, and dwell upon the value of courses of study and of methods of teaching in writing the history of the present time.

That at the end of this century pharmaceutical education is undergoing a quiet revolution, which is almost being lost sight of while men are discussing the value of degrees, has already been stated. To this quiet revolution attention should be called at this critical period. If the American Pharmaceutical Association should go on record as having given its attention to the value of degrees, while having overlooked the true inwardness of any and all education, it would but make itself the ridicule of future generations. The time is ripe for a bold step to be taken. On all sides educators are giving increased attention to the improvement of professional education. Engineering is taking the lead. Law, Theology and Medicine are vying with each other to raise the standard. Pharmacy is not backward. Courses are being strengthened and new degrees offered everywhere.

The fact that one pharmaceutical college after another is proclaiming new degrees, seems to indicate that the changes in pharmacy are meant to be more radical than those in any other profession. Practical experience was formerly the *sine qua non* of pharmaceutical education. The only school which years ago required no practical experience for its degree was considered the arch enemy of all pharmaceutical progress. This school has not only come to stay, but the number of similar institutions is growing every year. The oldest College of Pharmacy, the bulwark of the educational ideas of the past, to-day offers a loop-hole through which the non-experienced man may creep. Ostensibly not, for in payment of its two identical courses it offers two different degrees. The man with the experience of selling soda water and cigars is entitled to the doctor's de-

gree, whereas he with possibly the better education, and who spends his time more profitably at college, is dismissed with the modest degree of pharmaceutical chemist. Will not this college confer upon its Ph. C.'s, having acquired the requisite practical experience *after graduation*, the more ostensible title of Doctor of Pharmacy?

During the past few months three State universities have quietly and modestly announced their intention to offer four years' courses with but a modest compensation in the way of a degree. That which was ridiculed as the mirage of a pharmaceutical dreamer only a few years ago has to-day become a reality, which pharmaceutical educators cannot afford to ignore. The changes so widely advertised are but patchwork, improvements of the old, it is true, but chiefly in the line of antiquated ideas. The modest announcements of Ann Arbor, Champaign and Lawrence involve such radical changes that can but rouse to enthusiasm the most sanguine. A course that demands a high standard of admission, that places the pharmaceutical student in the same rank with the academic, has this year received the endorsement of three large State universities.

To lay aside for a moment the thoughts about older courses and their possible improvement, about the attempts to secure a compromise course which will be practical and please all, about the value of degrees, and to give your attention to the outline of a course which all pharmaceutical schools should strive after, is the bold request of the writer. The American Pharmaceutical Association cannot without losing its dignity recommend a course which like the tariff will be changed yearly by tinkering politicians. The course which the American Pharmaceutical Association alone can recommend must be one which will have a permanent value, an ideal over which pharmaceutical educators may glow with enthusiasm, and which will not be rejected by the highest educational tribunal of our country.

A year ago the writer discussed in detail some of the reforms necessary in pharmaceutical education. The conclusion arrived at was that *the pharmacist as a professional man must be placed on the same level educationally and socially with the physician, the lawyer, the theologian, in fact, with any learned profession.*

Educationally, the pharmaceutical student can attain this goal only by taking a complete college or university course of equal educational and cultural value with the very best offered in letters or science. To suggest such a course for serious consideration, not on an ideal but on a practical basis, is the object of this paper.

The fundamental requirements of such a course, like that of similar courses in letters, sciences or the arts, is a thorough preliminary education. What this preliminary education is to consist of, need not be decided by the writer nor by the American Pharmaceutical Association, but may well be left to the faculties of universities or their committees on accredited high schools and academies. The requirements may and will slightly differ

in different States. The older States may require more, the newer States less. Here the committee of seventy or like committees of our national teachers' association can and will do more to make requirements uniform than all pharmaceutical associations taken together could ever accomplish. This alone need be said—that the requirements for admission to the course in pharmacy should not be less than those demanded for admission to the science courses of the same institution. That such a requirement would practically rule out the apprentice and substitute a good preliminary education for bottle-washing and similar requirements of practical experience, should be merely a matter of rejoicing and congratulation.

Universities, as a rule, find that the preparatory high schools and academies do not prepare sufficiently for the pursuit of more than the elementary sciences, and in some respects not even sufficiently for these. Thus, for example, high school mathematics is not regarded as a sufficient mathematical preparation for university physics. As a consequence, a year's work in university algebra and trigonometry at least is demanded. Though many if not most pupils at high schools and academies study German or French, or even both, yet the knowledge required seldom if ever enables them to read fluently scientific German and French, both indispensable for the pursuit of the advanced sciences. Sufficient instruction in German and French to acquire a reading knowledge of these languages is therefore a necessity. Whether some advanced English is to be added to these anguages is a matter possibly of minor importance. The discussion led by prominent teachers on the subject of English during the past few years, would on the whole indicate that the requirement of some advanced English might be very wise. In addition to these languages and mathematical requirements, the fundamental sciences, physics, chemistry and biology may be considered as truly preparatory work in a pharmaceutical course.

The studies to be recommended for the first two years of a four years' university course of pharmacy would, therefore, be:

1. Mathematics $\frac{4}{5}$, German $\frac{4}{5}$, Chemistry $\frac{5}{5}$, English $\frac{2}{5}$.

2. Physics $\frac{4}{5}$, French $\frac{4}{5}$, Biology $\frac{5}{5}$, English $\frac{2}{5}$. $\frac{15}{5}$ or three full studies may be considered as the minimum requirement; good students being allowed to elect more work within their capacity.

By a one-fifth is meant a study requiring either one hour lecture or recitation and about two hours home study, or two hours laboratory work with about one hour home study. The courses in the sciences are naturally to be largely laboratory studies.

Upon such a foundation the student can safely build his pharmaceutical superstructure General chemistry is followed by pharmaceutical chemistry, general botany by pharmaceutical botany, general physics by pharmaceutical technique. These somewhat specialized pharmaceutical studies can then be followed by pharmacognosy, practical pharmacy and thesis. It will largely depend upon the calibre of the student and upon the amount

of work required in these studies, whether courses in physiology, pharmacology and toxicology, bacteriology, general and pathogenic, sanitation and hygiene, special food and drug analysis, pharmaceutical legislation and jurisprudence, etc., can be required or are to be offered as elective undergraduate, or better even as graduate studies.

The required studies of the third and fourth year, therefore, will be :

3. Pharmaceutical Technique—Pharmaceutical Chemistry—Pharmaceutical Botany.

4. Practical Pharmacy—Pharmacognosy, Thesis, Elective and Graduate studies.

This course is not recommended as being the ideal course in the mind of the writer. Our system, or rather lack of system, of education in this country, which applies particularly to the preparation for all truly advanced work in sciences, arts and letters, does not at present admit of what the writer would consider an ideal course. It is simply submitted for consideration because it was the first course of its kind offered to pharmaceutical students, and because for three years it has not proven impractical. Three years are too short a time to prove or disprove the value of a course, but the mere fact that several universities have recently offered similar courses seems to indicate that it is not considered by others as wholly unwise or impractical.

What is meant by pharmaceutical chemistry, pharmaceutical botany, etc., may be somewhat a matter of conjecture. Opinions may justly differ as to the details of these courses. It is for the principle that the writer desires to make an earnest plea ; a thorough general foundation, the general to be followed by the more specific, the most technical studies last. " Last, but not least" may well be applied to practical pharmacy and pharmacognosy. Two years thorough work in general and pharmaceutical chemistry is not too much for a genuine appreciation of the text of United States Pharmacopœia chemicals, when ninety-nine per cent. of our pharmacists, inclusive of many graduates and licentiates, cannot read the pharmacopœial text intelligently. To be able to read the pharmacopœial text and read it intelligently, certainly must be a fundamental requirement for the study of practical pharmacy. Any one who has only a faint knowledge of the complexity of plant chemistry, or how difficult the microscopic study of contorted and torn tissues of vegetable drugs is, will certainly agree that two years' preparation in chemistry and botany, general and pharmaceutical, is by no means too long a preparation for a scientific study of pharmacognosy.

The writer is greatly tempted to make an earnest plea for the cultivation of the cultural phases of practical pharmacy and pharmacognosy, as opposed to the more apparent technical phases of these departments of pharmaceutical study. To merely mention that these studies possess features of greatest general interest and of cultural value of no small de-

gree as chapters of the history of civilization (Culturgeschichte) must suffice at the present time. That such a course is not intended to make practical pharmacists, any more than any university course is to make immediately practical men, also scarcely requires emphasis. *University courses are to endow men and women with a great capacity for becoming efficient in their calling after they really enter into the same in the every-day battle of life.*

Furthermore, such a course is to prepare the general practitioner in pharmacy and not the pharmaceutical specialist, who in order to prepare himself thoroughly for his special field should pursue graduate studies along the line in which he desires to specialize.

This also can be but mentioned without further comment in this paper. Neither is it to be expected that all shorter courses will be dropped at once. To regulate them, however, does not lie in the interest of the American Pharmaceutical Association. It will be in the interest of each and every university or college to outgrow the short courses as soon as possible after a long course is once adopted.

One important question must by this time have arisen in the mind of reader or hearer. What is to become of our old Colleges of Pharmacy? They are largely dependent upon the number of students for their support. To make such demands of students as outlined above would decimate the ranks of their students and make them unfit to carry on the work they are now doing, not to mention the instruction in mathematics, the modern languages and the general sciences. Are these historical monuments of American pharmaceutical education to be destroyed because their courses have been weighed in the balance and found wanting? The alumni of these institutions would raise a cry of God forbid! throughout the entire length and breadth of this land, and justly so. Ruins acquire a romantic charm after centuries, but those who make them are none the better for their work of destruction.

If these institutions are so anxious to serve the cause of pharmacy as they claim to be, let them seek those conditions and surroundings which will enable them to be largely if not entirely independent of the number of students. American pharmacy is overcrowded, and the present competition is killing the truly professional remnant left in our profession. If professional pharmacy is once more to become a possibility, the ranks of the American druggist must be well nigh decimated in the course of time. Such a weeding of the pharmaceutical field can be conducted only on an educational basis. Those pharmaceutical institutions which are assisting in rapidly swelling the ranks of what has become a quasi-profession are therefore not serving the best interests of pharmacy. The manner in which this evil can be eradicated has already been indicated by the writer in a paper published in the "Rundschau" (1894, p. 54) on pharmaceutical fellowships. By donating their buildings and their entire working plant to

the State, they can ask support from the State for the education of a limited number of pharmaceutical students. By becoming affiliated with State Universities, or where these do not exist with other large educational institutions, not only by name, but by becoming an integral part of the same, students of these colleges can obtain, without further expense to the institution, all education and training in general sciences and in letters which they may demand.

The isolation of professional students is to-day one of the curses of professional education in this country. Contact, daily contact, with those whose thoughts run along other channels, is one of the greatest factors in the true education of all students.

The writer wishes to emphasize that he has no desire to be irreverent toward those historic monuments which supplied a crying demand when the large educational institutions of the East failed to recognize their duty toward one important branch of the healing art. That the University of Pennsylvania, Columbia College and Harvard University should have permitted the establishment of private colleges of pharmacy within a radius of five miles, was an educational sin for which the entire country suffers up to this day. It is to be hoped that the spirit of the founders of the olde colleges of pharmacy may revive at the close of this century. The necessity of pharmaceutical education is no longer questioned; the old narrow spirit which misused the classic mantle as a protection against contamination with what was thought mentally impure has given way to a broader university spirit, which reckons only with its duty toward mankind. If the forefathers of American pharmaceutical education had to establish isolated colleges to secure pharmaceutical education at all, let their grandchildren become imbued with a spirit of a pharmaceutical reinaissance; demand the affiliation of the creations of their forefathers with the great centres of learning of our country. The scattering of the educational forces in this country which shocks the European is to us a most pitiable sight. In unity there is strength, educationally as well as physically, and where there is a will there is a way. If the American Pharmaceutical Association is possessed of a truly national spirit, let it do something that will be nationally great in its results.

Madison, Wis., August, 1895.

PHARMACEUTICAL DEGREES—WHAT SHALL THEY MEAN?

BY ELIAS H. BARTLEY, M. D., BROOKLYN, N. Y.

There has arisen, lately, a discussion among pharmaceutical educators as to the requirements for graduation from colleges of pharmacy. A majority of those interested in the colleges seem to be in favor of raising the grade of the curriculum, while retaining certain landmarks that have been accepted as such for over half a century. Others have advocated that the requirement of previous store experience be abolished. The

course of instruction against which this latter class protest is the result of the experience of the older schools. These schools have been governed by practical pharmacists of known ability, who have largely guided the development of pharmacy for seventy-five years or more.

The general plan of instruction in American colleges, as we find it to-day, is the result of experimental evolution.

It must not be assumed, however, that pharmacy is to remain what it is to-day, and what it has been. We expect it to advance, and the needs of the student of pharmacy must change with it. There is to-day a need of different training from that made necessary by the condition of business twenty-five years ago. The curriculum must be modified as the needs of the student change.

That system of instruction will be the most successful in turning out the best pharmacists, which best prepares young men and women to stand behind the counter and prepare and dispense medicines.

The *best pharmacist*, I believe, is the one who can best interpret and carry out the desire of the physician as expressed in his prescription. But this is not all of modern pharmacy. Success in business, as a pharmacist, requires a great deal more. It requires a certain amount of business method, tact in dealing with the public and the medical profession, an ability to hold trade and get fair prices in the face of competition and trickery, the ability to detect dangerous customers, etc., etc. To be able to properly care for the stock of a well-equipped pharmacy, and to carry out the wishes of the physician, the blundering physician often, and prepare a sightly and palatable prescription, requires no little knowledge of drugs and chemicals. To fit a man or woman properly to do what we here outline should be the aim of pharmaceutical education, whether that education be obtained in a store, in a college, or in both.

It can not be doubted that education in a college is more systematic and more uniform in the scientific training than that obtained in the store alone, provided the course of instruction is properly arranged. To be properly arranged, it must give due prominence to the practical training in the *art*, as well as in the *science* of pharmacy. The mistake has been, and is still made in many schools, in allowing the science or theory to outweigh and eclipse the art. Too much care has been exercised in training the head, while the hands have been left as clumsy and unskilled as a ploughman's. It is just as important for the pharmacist to be able to do, as it is for him to know what to do, and the one does not necessarily follow the other. Skilled labor always requires training with the tools in hand. I wish to impress the great importance of training in manipulation and methods, as a part of pharmaceutical education. I have very often heard the complaint from employers, that the clerks that come to them from the colleges know nothing about manipulation. They know nothing about how to make a pill mass, or how to treat the simplest difficulties in com-

pounding mixtures, while they can quote the formulas of the coal-tar colors, or describe the manufacture of iron, steel or buck-shot by the hour.

While it is true that a great deal of the pharmaceutical education has been, and is one-sided, or, rather, lop-sided in this respect, we cannot agree with the advocates of the other extreme, that all, or nearly all, the training should be of the practical kind. The theoretical and practical manipulative training should go together, and should occupy about an equal portion of the time.

I have found by experience, that sufficient stress is not laid upon accuracy in methods. In the simple matter of weighing and measuring, it is only with the greatest care and constant watching that our students can be trained to make accurate measurements. The word "about" has no place in pharmaceutical or chemical training. I may venture to remark here, that the average pharmacist is more than careless in this matter. I have seen measures of one ounce, as measured by different pharmacists, vary 25 per cent.

The students should be taught accuracy in manipulation. I know of no method of teaching this to be compared to quantitative chemical analysis, where accuracy is a sine qua non. It ought to be in prescription work, and should be impressed upon the student. Can the college alone, with the limited time now required of the student, establish the habit of accurate manipulation? Can a slouchy, slip-shod boy of twenty or twenty-one years be re-made and trained in methods of neatness and accuracy in eighty days, or in three afternoons a week for six months each of the two years? Most certainly not. The time is too short to work such a change. His college training must be supplemented by the same kind of training in a store. It is absurd to think of turning out a young man after what amounts to about three months' instruction, conferring a degree upon him and sending him out with the idea that he is a pharmacist. A bricklayer, a carpenter, a painter, or any other artisan, could not get any recognition or standing among his kind by any possible training in this time.

And yet we have among us those who advocate this sort of pharmaceutical education. In so doing, they propose to make the time-honored degree of Graduate in Pharmacy utterly worthless, because it will mean nothing. There are some colleges of pharmacy in the United States whose degrees can have no standing in many of the States.

The Boards of Pharmacy are obliged to discriminate against these colleges, and refuse to register their graduates without an examination. This is so in New York State. The effect of this is to lower the dignity of a pharmaceutical degree and pharmacy. In all other technical and professional schools, the tendency is to improve the facilities and raise the requirements. Is this the case with our colleges of pharmacy? There can be no doubt that in a majority of cases we can answer this question in the affirmative. There are a few schools where the tendency is not clearly

towards advancement. Have these few educators found a shorter road to knowledge than the rest of us, or have they discovered that we are requiring too much of our students, or is it for some other cause that they have advocated the abolition of store experience from the requirements for graduation?

It cannot, certainly, be an attempt to cut the requirements to draw trade from other schools; for we had always believed that educational institutions, and especially universities, were above suspicion of anything in this line. We are compelled to admit, however, that the effect of the course adopted by these reformers appears, in fact, to be a bid for patronage. Perhaps this is unintentional on their part, and appearances are deceptive.

It is true that the requirement of four years' store experience, previous to graduation, limits the number of young men who will enter a college of pharmacy, but, on the other hand, such students are better prepared to receive scientific training.

Aside from this, a degree has generally had a certain educational significance. We instinctively respect a man who has a degree conferred upon him by a college. We have to-day three degrees conferred by Colleges of Pharmacy, viz.: Graduate in Pharmacy (Ph. G.), Pharmaceutical Chemist (Ph. C.) and Doctor in Pharmacy (Phar. D.) Of the last it may be said, that it is sometimes given for one thing and sometimes for another. It has, therefore, no fixed meaning. The second has generally been given by certain schools which have not pretended to exact anything but a course of college training. We may well approve such a degree if the training is sufficient to merit any degree whatever. It should mean that the man possessing it has been specially trained for the position of a manufacturer of pharmaceutical chemicals and products. He is not generally regarded as a pharmacist, nor should he be, until he has learned the business like any other apprentice.

The degree of Graduate in Pharmacy should also have a well-defined meaning. By this term we should understand that the person holding this degree is fit in every respect to conduct a pharmacy. He should be what the State expects him to be, what the medical profession expects him to be, and what the public expects him to be—a man who is thoroughly competent, safe and trustworthy to handle and dispense medicines in a scientific, accurate, compatable, sightly, palatable and safe form.

He should stand ready and competent to protect the public from mistakes or injury from careless prescribing, bad advice from old women, meddlers, and the army of people with a dangerous littleless of learaing. The responsibility of the pharmacist demands that he shall be specially trained for that particular work. Most of the States very properly require that time shall constitute an important element in his preparation. "Cramming" for an examination is not the kind of education that makes safe pharmacists. The question for the colleges to decide is, Shall the degree

of Ph. G. mean in the future what it has meant in the past? Shall the requirements for the degree be kept up to the requirements of the States for license, or shall they be dropped down to the convenience of the student and the disgrace of the college? Shall we make this time-honored degree so cheap that it will have no value, and so common that students will not care to possess it? When this is done, the Schools of Pharmacy will have degenerated into what have been called "diploma mills." It will be far better to confer no degree at all, than one that is worth nothing. I am opposed to any modification of the present requirements for the degree of Ph. G. that shall in the least depreciate its value or its meaning. Let us, rather, make it a degree worth striving for, and one to be proud of. Let the Colleges of Pharmacy define among themselves exactly what it shall mean, and not wait for the legislatures to say what we shall teach, as they will soon be obliged to do, as they have done in the case of Doctor of Medicine.

It is a safer thing for a conscientious faculty of a teaching college to decide upon the fitness of a young man, after observing him for two or three years, than to delegate it to a board of political appointees, who must judge a man by a few questions and answers. But if the colleges can not fix upon some uniformity of requirement, then the public must be protected by the State.

LAWS FOR THE PREVENTION OF ADULTERATION OF DRUGS.

BY C. T. P. FENNEL.

Man, the producing force of the results and products of a life under the dominion of reason, frequently fails to comprehend the signs of the times, and consequently, likewise, fails in reaping the benefits which would accrue to him from a proper and unprejudiced consideration of the facts of his own creation. One of the most influential causes of improvement in the social conditions of mankind is that spirit which induces men of thought and foresight to carry out and adopt those suggestions upon an unselfish basis which present themselves during the gradual development of communities. The founders of the American Pharmaceutical Association were possessed of this spirit and recognized this principle in the primary object of the constitution as follows: To improve and regulate the drug market, by preventing the importation of inferior, adulterated or deteriorated drugs, and by detecting and exposing home adulterations. In considering the history of this Association, we find it to be an institution founded by men recognizing the signs of their day and carrying out the suggestions that were conducive to the improvement of the pharmaceutical profession of their day. The account of the evolution of this institution of American pharmaceutical civilizatione mbodied in the Proceedings, her fruits, and the gathering of these fruits, together with the final disposition of these fruits, clearly demonstrates a vigorous and pros-

perous growth, and one that was conducive both to the welfare and power of her followers and the general public.

In considering the movements and results of all organized bodies, we find that one and all are subject to certain limitations, and that when these are once reached, society, communities, and even industries, cease to pay tribute to the decrees of such institutions. It is but natural that the American Pharmaceutical Association should pass through the same cycles through which all organic forms produced by the desires and ambitions of mankind pass in the fulfilment of their primary object.

The American Pharmaceutical Association can no longer expect to enforce its primary object, and must submit to the inevitable laws in the evolution of the civilization of mankind, and bow down to a greater power in the enforcement of her own cherished desires. In this submission the American Pharmaceutical Association does not lose her individuality and influence; on the contrary, the Association must aim higher to improve the science and art of Pharmacy by diffusing scientific knowledge, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home productions, thereby becoming the power behind the throne. The enforcement of her decrees and standards must of necessity be carried out through the respective states of government, and eventually by the government itself.

Internal development and contact with foreign countries of civilization by men of energy and thought, devoting their talents, time and wealth to the realization of the benefits produced by discoveries and inventions of science, whether they be for selfish or unselfish purposes, are the primary causes which have brought about social and economic conditions compelling governmental supervision.

The evolving of a higher state of culture by the development of mental and mechanical means affects rich and poor alike, and consequently it is but fair to assume that the struggle for existence manifested itself five centuries ago as much as to-day. Competition in trade, as a matter of fact, existed at all times during all ages of civilization, and when conducted upon an honorable basis, was productive of equal prosperity, while upon a dishonorable basis competition bred dishonesty and brought poverty to the community in which practiced. The sacrifice of quality for quantity is not brought about by public demand, but is brought about by dishonorable traders, and according to the first law of nature, self-protection forces honest traders to sacrifice quality for quantity to such an extent that eventually the market is flooded with cheap but adulterated products.

Adulteration of all kinds was practiced in the civilized countries of Europe at a very remote date, to such an extent that the governments of Great Britain, France and Germany were compelled, for the welfare of their own people, to take cognizance of the practice.

Careful review of the enactments passed by these respective govern-

ments shows that the same were originally designed to control or regulate frauds in weight and measure. Gradually the ingenuity of man was more misapplied, and extended to the sophistication of the daily commodities, and, consequently, the then-existing laws were so modified as to include falsifications. Following the cycles of evolution of these laws, we find a development of the acts regulating the food supply, which culminated in the English Food and Drug Act of 1875, proposed by the Society of Public Analysts. Without entering into the details of the act, we are safe in saying that this measure has done more to excite public attention to the extent of food and drug adulteration, to the enormous profits produced by adulteration, to the injuries to public health, and to the degradation of the business morals of the people, arising from cheapening and degrading the quality of all products of commerce, than any other measure brought before an intelligent public.

In our own country, owing to a peculiar trait of character of our people, agreeing not to profit by the experience of older nations, all enactments seeking purity of food and drug products have been too specific to foster permanent reform. That such should be the case is not strange when we consider that the enactments themselves, in the majority of instances, were brought about by sensational newspaper articles, originating in the fertile minds of enterprising reporters, inciting public prejudice against specific commodities. The desired object of suppression was gained for the time being, but in a very short period these enactments became dead letters upon the statute books. All State legislation has been of the same nature, and the results of this kind of legislation practically the same. The government at large has taken no action in securing purity of food supplies by legislative measures, although some action was taken securing purity of imported drugs. According to this Act of Congress certain drugs, especially cinchona bark and opium, must meet certain requirements based upon various official pharmacopœias.

To-day, Ohio is probably better off than any other State in the matter of laws for the prevention of adulteration of food products and drugs, mainly due to the efforts of Hon. F. B. McNeal.

The reform in pure products has been of exceeding slow growth and of a spasmodic nature until the subject was intelligetly considered on a broad basis for the best interests of all the people.

All legislation must have two objects in view: first, the protection of the health, finances and morals of all the people, and secondly, protecting on the one hand the consumer against impure products, and on the other, the dealer against imposition in trade.

To attain these ends legislation was sought and only obtained through years of quiet and persistent labor, by fair and complete representation of the various industries affecting the health of the people.

The provisions of the various acts regulating the sale of food and drug

products being established upon a consistent basis, the question of the best method of carrying out their intent will be the first to confront. Many difficulties will naturally be encountered, such as the purchase of products in the open market, treating all in the same industry alike ; the risk of obtaining products, misrepresenting the true quality, brand and manufacturer ; but honesty combined with good judgment and experience of a a short period will show what policy to pursue in the enforcement of the legislative acts to obtain the greatest good for all concerned.

The next question of importance, is the adoption of standards of purity, the verdict of quality being dependent upon the analysis of the product under consideration. Unless the enactments contain specific standards, the question arises whether the analyses show violations of the law in respect to containing ingredients that are not normal to the product. To give a positive answer, it will be necessary to have a clear understanding of what constitutes the product under consideration, the process of its manufacture, and to what extent these constituents may vary under legitimate influences. Unfortunately, chemists, as well as doctors and lawyers, will disagree, and where there exists no statutory definition, the intent of the law may be completely lost. On the other hand, arbitrary standards may inflict severe hardship upon producer and consumer, and render the enactment ineffective.

In the Ohio Drug Act, three provisions are made covering the adulteration of drugs :

1. When differing from the standard of strength, quality or purity, laid down in the U. S. P.

2. If not recognized in the U. S. P., when differing in strength, quality or purity, laid down in some other pharmacopœia or other standard work on Materia Medica.

3. When differing in quality, strength or purity, as professed by label.

Considering these standards we must admit that the commission could not be governed by a better authority than tne U. S. P., for this criterion is established by pharmacists for the use of pharmacists, and recognized a legal authority in every court of this Union. Such being the case, this work should be a true exponent of pharmaceutical knowledge of the day, and thoroughly consistent in facts. The restrictions placed upon some drugs and medicines may in many instances be difficult of compliance, but as a whole, the Pharmacopœia offers to pharmacists every protection with the exercise of but ordinary care and judgment. Under the second provision of the act, the commission has recognized the National Formulary as the next best authority. This work also embodies the opinions of pharmacists for the use of pharmacists of preparations in common use, and consequently a true exponent of American pharmaceutical art under the official recognition of the American Association of Pharmacists. No objection could be raised against these authorities excepting one, and that

one being that the official period of validity of ten years is too long to serve the wants of pharmacists in this rapid age of progress.

As stated in the beginning, the American Pharmaceutical Association must recognize that the fulfillment of the primary object of her constitution has passed beyond her circle of control, but that her circle of usefulness exists in authorizing eliminations, modifications and additions to the Pharmacopœia of all such products which meet existing conditions, based upon the actual experience of honest and trustworthy experimentation.

Cincinnati, July 10, 1895.

REGISTRATION REQUIREMENTS OF AMERICAN PHARMACY LAWS.

BY J. H. BEAL, SCIO, O.

The essence of a pharmacy law is that portion which determines the qualifications of the licentiate, and the manner of his registration. All other portions of the law are subsidiary to this, the principal feature, and exist only for the purpose of making it effective. In proportion as the registration requirements of the law are perfect, so is its efficiency as a protection to the pharmacist and a safeguard to the public.

GRADES OF LICENTIATES.

About eighteen of the pharmacy laws of the United States make provision for two classes of licentiates, a higher grade presumably for the proprietor or responsible head of a drug store, and a second grade of less rigorous requirements for those who serve in positions of less importance. There is much to be said in favor of two classes of licentiates. The actual conduct of a pharmacy really requires the services of two grades of men—a manager, who in practice is usually the proprietor, and one or more assistants. The law should recognize this necessity, and provide the means of meeting it. A large proportion of the every-day duties of the store may very well be discharged by persons of less training and ability than is required of one who fills the important and responsible position of manager; and to require that all such duties shall be performed by fully qualified pharmacists either imposes an unnecessary hardship upon the proprietor by compelling him to employ a more expensive grade of help than the nature of the services requires, or tempts him to violate the law by the employment of unqualified assistants.

A prime result of the law's providing for but one grade of licentiate is to lower the standard of examinations in that State. The Pharmacy Board must either subject all examinees to a test of such severity as to permit the passing of none but those who are sufficiently qualified to act as managers and proprietors, or it must lower its requirements so as to pass those who design to fill subordinate positions only. The demand for cheap help usually compels it to do the latter, and to license men of less proficiency than it otherwise would. In any event, the standard is either too high for

one class or too low for the other. It may not be true universally, but it is commonly the case that in the states where but one grade of licentiate is provided for, the standard for admission to that grade is but little, if any, higher than is required of assistants in other states.

In the writer's opinion every law should provide for two grades of licentiates, and further, should make it obligatory upon every person to pass a certain period of service as licensed assistant before becoming eligible for examination for admission to the higher grade. Such a requirement would, doubtless, do much to discourage the superficial preparation for examination which results from a too easy and too speedy admission to the rank of pharmacist. In proportion as the higher rank is made difficult of attainment, the more it will be prized and the more valuable it will be to its possessor.

THE TITLES OF LICENTIATES.

The official title of the pharmacist is probably a matter of small importance ; by whatever name distinguished, he will probably continue to be the same unassuming, unobtrusive, public-serving individual as at present ; but it would add not a little to general convenience if the same titles, with the same meanings, were used in all of the laws.

At present we have "Pharmacist," "Registered Pharmacist," "Apothecary," "Licensed Druggist," "Licentiate in Pharmacy," and several other combinations as the official designations of the first grade. For the second grade there is "Assistant Pharmacist," "Registered Assistant," "Registered Assistant Pharmacist," "Qualified Assistant," and so on. Of all the terms used, none seem better adapted for their purpose than plain "Pharmacist" and "Assistant Pharmacist." Both are familiar and express at once their relative rank, which is not the case where dissimilar terms, as "Apothecary" and "Druggist," are employed for the first and second grade of licensees, respectively. As for the prefixed terms, "registered," "licensed," "qualified," etc., no good reason suggests itself. We do not say "registered attorney," "licensed notary," or "qualified physician," and there is no good reason why the pharmacist should be made an exception. The terms are useless at best, and are too suggestive of pedigreed live stock to be pleasant.

REGISTRATION ON PHARMACY DIPLOMAS.

About thirty laws contain provisions permitting the registration of graduates in pharmacy without examination. In the majority of cases the exception is only in favor of graduates of schools requiring four years' experience before granting a diploma, but in a few States (as in Connecticut), the privilege is extended to the graduates of all "reputable" or "recognized" schools or colleges ; the duty of determining what schools shall be so regarded being left to the Board of Pharmacy.

It is questionable whether an exception should be made in favor of any

candidate, whether a graduate or not. If a college course qualifies for the practice of pharmacy, it certainly ought to qualify for examination by the pharmacy board. Above all other persons, graduates in pharmacy are interested in having a high standard of admission maintained, and ought not to claim any special privileges or exemptions which have a tendency to lower or weaken the standard.

A provision of still more doubtful propriety is found in several laws, exempting from the necessity of examination the graduates of all schools located within the State which enacted the law. The design of such legislation is to encourage the growth of local schools by discriminating against the graduates of outside institutions.

It is very doubtful, to say the least, whether such a discrimination is not in conflict with that provision of the Federal Constitution which prohibits a State from granting to its own citizens any privileges or exemptions not equally granted to all the citizens of other States who may come within its borders. Granting, however, the legality of the provision in question, it is unfortunate that the principle has been introduced into pharmacy legislation. Other States may be expected to follow the example thus set them, and the final result must be that each State will have its own pharmacy schools, patronized only by its own students.

REGISTRATION OF PHYSICIANS AS PHARMACISTS.

A matter of much greater consequence than the registration of graduates in pharmacy without examination is the exception made in many pharmacy laws in favor of practitioners of medicine and holders of diplomas from medical colleges. In a few cases (as in the District of Columbia and Georgia) the provision only relieves them from the requirement of experience which is demanded from other candidates, but in other cases it extends to the point of permitting them to register without examination, and in at least one instance, to the extent of permitting a physician to practice as a pharmacist, without even the bare formality of registering as such, though both examination and registration is required of all other licentiates. The law of that State, in effect, declares that a medical course is a better preparation for a pharmacist than a course in pharmacy! There the quickest and cheapest way to become a pharmacist is to study medicine, since, before the law, the graduate of a fourth-rate medical college is not only the equal, but the superior of a graduate of a first-rate college of pharmacy.

REGISTRATION ON CERTIFICATES OF OTHER STATES.

In about twelve states permission is given to register upon certificates showing prior registration in another State. In some cases the permission is in general terms, while in others the privilege is restricted to the examinees of boards whose requirements are equal to those of the board which is asked to register the holder of the certificate.

The great desirability of some system which will permit examinees of one State to register in other States without re-examination has caused it to be seriously proposed that all of the boards agree upon a uniform standard of examination, and thereafter admit to registration in each State any who have previously passed the standard examination elsewhere. Admitting that much good might result from a greater uniformity in the character of examinations, it must not be forgotten that the powers of State boards are given specifically by the statutes which create them, and that unless these expressly, or by plain implication, provide for registration upon certificate from another State, the boards would be powerless to grant such registration, which if granted, would be clearly illegal.

AGE AND EXPERIENCE REQUIREMENTS.

Only about twelve laws make any provision respecting the age of the persons who may be licensed as pharmacists. Some of the laws which do not specify the age of the higher grade of licentiate, nevertheless do so for the lower grade.

Twenty-four out of forty-nine laws examined require an experience of from two to five years for pharmacist's license. Only fourteen laws make any provision as to the experience of assistants. Singularly enough, two laws require experience of the assistant and do not require it of the pharmacist. It would thus be possible for one to be the owner and manager of a store at a time when he could not legally serve as assistant under another manager.

Such omissions as failing to prescribe the age and experience of the manager while fixing them for the assistant are, no doubt, attributable to oversight, and illustrate very well the loose manner in which many of the pharmacy laws have been drafted.

In several States where the law does not require a certain age or term of experience, the Boards of Pharmacy have adopted rules fixing the age and experience of all candidates for registration. Whether such an action is legal or not, it seems to be generally assented to, and to operate beneficially. In a calling such as pharmacy, at once both mercantile and professional, and involving in its conduct the knowledge of such a multitude of technical details as perhaps no other vocation requires, it would seem to be eminently fitting that no one should be permitted to enter upon it, no matter how well trained in the science and art, except he enter by the ancient and honorable door of apprenticeship.

RENEWALS.

An anomalous feature of pharmacy legislation is in the provision found in many laws requiring licensees to periodically renew their registration, and, of course, pay a fee for each renewal. The sole excuse given for this strange provision is that the revenue thus obtained is necessary for the

maintenance of the Pharmacy Board and the enforcement of the law. As has been frequently pointed out, the renewal fee is strictly in the nature of a special tax upon the druggist for the enforcement of a law which is as much for the public benefit as any upon the statute-book. The druggist already pays more than his full quota of taxes and fees, and ought not to be subjected to the further imposition of renewals.

The preceding brief review of registration requirements serves to show how widely the laws differ in their provisions upon the same subjects, and to direct attention to some features which call loudly for amendment. There are symptoms visible which indicate that within the near future amendments to the various pharmacy laws will be numerous and important. Unless some concerted action can be agreed upon, the laws when amended are likely to exhibit a wider divergence in their provisions than they do at present.

Since Federal legislation is out of the question, the only remaining source which may be looked to for help in bringing about uniformity is through some action of the American Pharmaceutical Association. If this body should pass upon the essential provisions of a pharmacy law, leaving subordinate matters to be adjusted in accordance with local conditions, there is scarcely a doubt but its recommendations would be largely followed when pharmacy laws come up for amendment, and the main object of this paper is to suggest the importance of some such action on the part of this Association.

ENTERTAINMENTS AT THE FORTY-THIRD MEETING.

PROMINENT among the pleasures and enjoyments of the Denver meeting were the numerous occasions of feast offered both to the mind and body on the road to the place of gathering. A considerable number of Eastern members with their ladies boarded the train at different points on its way from New York to Cincinnati. At the latter place a fine dinner was tendered the visitors at the Grand Hotel by the pharmacists of the Queen City, which was greatly enjoyed by the travelers after twenty-four hours of continuous railroading; many thanks are due the Committee represented by Messrs. Gordon, Lloyd, Eger, Fennel, Sauer, Wetterstroem, and others, for their kind attention on this occasion. Having been joined by a large delegation of Ohio pharmacists, the party proceeded westward, making their next stop at St. Louis on Sunday, August 11th. Here they were received by a large body of friends at the magnificent Union Depot and escorted to the Planter's Hotel, where a reception was held in the hotel parlors, which was attended by many local pharmacists and their ladies. Following this, the party paid a visit to the extensive plant and grounds of the Annheuser-Busch Brewing Company, under the guidance of Messrs. Good, Whelpley, Alexander, Layton, Spilker, Braun and others. After dinner the visitors were taken in carriages through the principal streets and parks of the city, the day's entertainments concluding with a luncheon at the cottage in Forest Park. On Monday morning, August 12th, the journey was resumed on a special train, the traveling party having been considerably augmented by the accession of the Missouri delegation. A stop for dinner was made at Jefferson City, where a beautiful floral design in the shape of a huge mortar and pestle was presented on behalf of the citizens in a happy speech by Mayor Silver. Arriving at Kansas City in time for supper, the party was treated to an electric car ride through the city while waiting for a late hour of departure.

On Tuesday, August 13th, the party stopped for breakfast at Ellis, Kans., where a visit was made to the only drug store of the place, which, although carrying a varied stock, was conspicuous for the total absence of shelf bottles. Dinner was taken at Cheyenne Wells, Colo., a place consisting of one house and two cyclone cellars. Here the travellers were paid the compliment of being the first party to stop without having a fight. The rather scanty vegetation around the hotel having suggested the inquiry as to what was raised at this place, the hotel-keeper, with a bland smile,

remarked, "They raise h—l occasionally, that is all; everything else comes from distant points."

(The writer regrets that he is not in possession of the data necessary to outline the trip of the members from the South and Southwest as well as those who traveled by way of Chicago, as he has been informed that numerous courtesies were extended to these parties along the route.)

All having safely arrived at Denver, the members of the A. Ph. A. on Wednesday evening, August 14th, were tendered a reception by the pharmacists of Colorado in the spacious parlors of the Brown Palace Hotel. A very pleasant evening was spent, thanks to the untiring efforts of the Committee; the chief topic of conversation being, of course, the beautiful scenery so lavishly supplied by Nature's hand in the neighborhood of Denver.

President Arcularius bid the visitors a hearty welcome on behalf of the State Pharmaceutical Association, which was appropriately replied to by Prof. Good, who assured the local fraternity that nowhere had the A. Ph. A. been received with more warm-hearted cordiality than at this elevated spot.

Friday, August 16th, was devoted to a most delightful excursion by rail through Clear Creek Cañon to Silver Plume. This proved quite a revelation to most of the visitors, who for the first time had an opportunity of seeing the beauties of these wild gorges of the Rocky Mountains. To say that this trip was grand is to express it but mildly, and long will the memories of the beautiful scenery linger in the minds of all who participated. Clear Creek Cañon is one of the wildest and most romantic gorges in Colorado, and offers numerous points of interest to the observant traveller, among which may be mentioned the wonderful Hanging Rock, Inspiration Rock, The Snowy Range, Gray's Peak and Idaho Springs. At some points the gorge is very narrow, its sides rising almost perpendicularly to a height of from 500 to 1,500 feet and the water rushing along with a swift current. At Georgetown the cañon opens again, and a few miles beyond is the famous "Loop" with its wonderful and almost bewildering panorama of scenery. Here also the high bridge on which trains cross the lower tracks at an altitude of ninety feet, is worthy of special mention.

Through the kindness of Mr. Richard Old, the owner, the party was permitted to visit the Mendota mine at Silver Plume and pass through the Victoria tunnel, especially constructed by Mr. Old, at an outlay of $20,000, for the more convenient transportation of the rich silver ore. The mine is said to yield about $50,000 annually, and is valued at half a million. An ample luncheon had been provided by the Denver pharmacists, which was highly appreciated and enjoyed by every one. The return trip was made almost wholly by gravity, being on a down grade, and offered an excellent opportunity for an unobstructed view of the fine scenery, by riding on the cow-catchers of the engines, which was enjoyed by a few ladies and gentlemen of the party the greater part of the way.

On Monday evening, August 19th, an organ recital was given by Dr. J. H. Gower at Trinity Methodist church, opposite the Brown Hotel, which was largely attended by members of the American Pharmaceutical Association. A rare treat was in store for all present, as Dr. Gower, who is a finished artist, in a series of choice selections brought out the full beauties of the immense organ, one of the largest and finest in the country, which was built at a cost of $40,000, and facing the audience, occupies the full width of the large church. The program was interspersed with delightful renditions of vocal music by the Misses McFarland, and some choice productions on the piano, violin and violincello by Mr. and Mrs. Augermuende and Mr. Zietz. Every one was loud in his praise of the evening entertainment, and the charming voices of the young ladies made a most favorable impression.

As a fitting end to the series of entertainments, the Chamber of Commerce, on the afternoon of Tuesday, August 20th, invited all the members to an electric-car ride through the streets and suburbs of Denver, which afforded an excellent opportunity for obtaining a correct idea of the extent and beauty of the Queen City of the Plains. City Park, Elitch's Garden, Manhattan Beach, and other points of interest were visited, the ride occupying about three hours. At 9 o'clock in the evening of the same day a final reception was given by the ladies of Denver in one of the lower rooms of the Palace Hotel, at which ice-cream and punch were served, and several hours spent in pleasant companionship.

Among other entertainments enjoyed by individuals during the meeting were the lectures on cooking by Miss C. C. Bedford of New York, daughter of the late Prof. P. W. Bedford, and visits to the State University, the Chamberlain Observatory telescope, and the works of the Globe Smelting and Refining Company.

After adjournment of the meeting, the members separated in groups, a large party starting off on an excursion to Salt Lake, Utah, taking in the trip "Around the Circle," and visiting various points of interest in the Rockies on the return. A number started for Manitou and Colorado Springs, where two or three days were delightfully spent in carriage drives through Williams' Cañon, the Ute Pass, to Glen Eyrie, through the Garden of the Gods with its wonderful sandstone formations, and over the beautiful Mesa with its picturesque surroundings; the event of the trip being the ascent of Pike's Peak by rail to the signal station at the top.

Much credit is due Messrs. Ford, Best, Stromberg, Ward, Kochan, Scholtz, Angell and other members of the Denver Committees of Reception and Entertainment, for the excellent arrangements made for the comfort and pleasure of the visitors.

CHAS. CASPARI, JR.,
Permanent Secretary.

ANNUAL REPORT

ON THE

PROGRESS OF PHARMACY.

From June 30, 1894, to July 1, 1895.

By Henry Kraemer.

The work of the Report of 1894–95 was begun on a scale like that of last year, but subsequently learning from the Secretary the expense to the Association in issuing large Reports, and also from the Treasurer that the Association was not in a position to publish such a large work, the Reporter has reduced the contents of the present Report to about 500 pages. While the Reporter still firmly believes that the Report should be made thorough and comprehensive, and that it will eventually pay the Association, still as an individual ought not, the Association dare not do more than it can afford to do at present without further thought in this matter of finances.

Furthermore, it does seem undesirable to some to publish so much that can be utilized by but very few members. And the Reporter is strongly of the opinion that if the Association has a few hundred dollars at its disposal it will be far more profitable to begin a fund that shall have for its object the establishment of "Pharmaceutical Fellowships," along the lines advanced by Dr. Fr. Hoffmann, supported by Professors Kremers and Patch, and realized, during the past year, by the Schools of Pharmacy of the Universities of Wisconsin and Michigan. So much has been written and brought before the members of the Association on this subject that there is no member who is unfamiliar with the aim of "Pharmaceutical Fellowships." It is along the lines of the education of men of character that all the questions that threaten the pharmacist are to be met.

During the past year the questions of Tax-Free Alcohol, the Military

Pharmacist, Department Stores, Tablet Triturates, etc., have been widely discussed, and a resumé of these subjects will be found in the Report. The work of Peckel Möller on Cod-Liver Oil is an important addition to Materia Medica and Therapeutics, and ought to serve as a warning to all interested in "Elegant Pharmacy."

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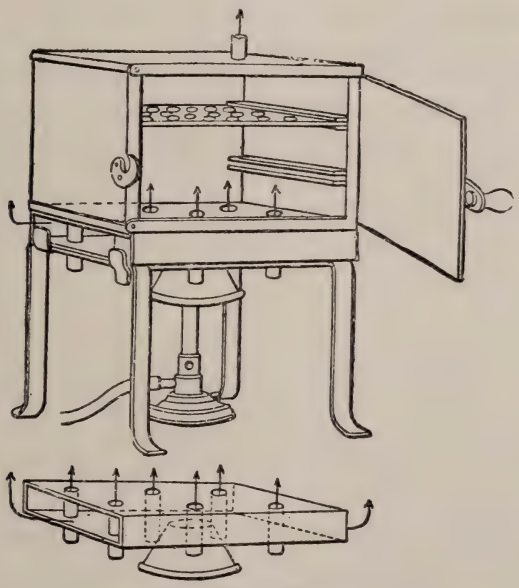
PHARMACY.

Apparatus and Manipulations, Etc.

An Aluminum Air-Bath.—L. Meyer.—Aluminum may be used with advantage for the construction of the air-baths devised by the author, on account of its high conductivity for heat and its permanence in the air. The layer of oxide formed does not scale off. The apparatus has now been constructed with side doors, which are more convenient for many purposes than those opening from the top.—Ber. d. Chem Ges., 1894, 2769.

A New Form of Air-Bath.—The air-bath here illustrated, which is described by E. Sauer (Scientific American), is claimed to be an improvement on present devices. In order to insure a constant temperature,

Fig. 16.



Sauer's Air-Bath.

which shall not be limited by the boiling point of some liquid contained in an outer jacket, the author has devised the form of air-bath shown in the figure. The bath has a false bottom, perforated to allow a series of tubes to connect the inside of the oven with the outside air beneath the apparatus through the real bottom; the latter, in addition to corresponding perforations, has a larger central aperture through which the flame of a Bunsen burner can play upon the false bottom and around the connecting tubes; the products of combustion pass away through the sides of the

lower chamber between the two perforated plates, the sides being left open. Evaporation is facilitated by the rapid renewal of the atmosphere within the bath by means of the tubes; and experiments are quoted to show that not only is evaporation rapid, but the temperature at different points of the bath is uniform.—West. Drug. 1895, 233.

Mechanical Agitator.—C. Maull.—In this instrument the bottle to be agitated is placed horizontally and then shaken by means of an excentric attached to a wheel driven by a small turbine.—Ber. d. Chem. Ges., 1894, 1732.

A Continuous Automatic Mercury Air-pump for Chemical Purposes.—G. W. A. Kahlbaum.—For a detailed description and figure of the pump reference must be made to the original paper. The pump consists of two parts: a Sprengel pump and an apparatus in which the mercury that flows away from the Sprengel is sucked up by the current of air induced by a water-pump. It is thus sucked up in the form of short columns, separated by the spaces of rarefied air, and as the total weight of its composite column can be much greater than that of the barometer, it is possible in this manner to raise the mercury to such a height that it will flow back into the top of the Sprengel for further use there. The modification of the pump described is intended for use in vacuum distillation; the distillation apparatus is evacuated as far as possible with the water-pump, and then the pressure is reduced to 1 mm. with the mercury pump. This last diminution of pressure is very advantageous; for instance, whilst a reduction of pressure from 760 to 50 mm. only lowers the boiling point of benzyl alcohol by 80°, a reduction from 10 to 1 mm. lowers it by 32°.—Ber. d. Chem. Ges., 1894, 1386.

Accurate Determination of Atomic Weights, using Silver as a Secondary Standard.—G. Hinrichs compares the results obtained by Dumas, Stas and Cooke for the atomic weight of sulphur, referred to that of silver taken as 108. The author maintains that the atomic weight found is a function of the amount of silver taken.—Compt. rend., 1894, 528.

Atomic Volumes.—(C. T. Blanchard (Chem. News, 1894, 271). Since Lothar Meyer's work on atomic volumes there have been no tables of these important physical properties constructed to harmonize with the most recent or best authenticated values for both atomic weight and specific gravity. The author snbjoins a table so constructed for the elements, placing the hitherto received values, according to Lothar Meyer, in the last column, O = 16. The specific gravity is taken at 0° C.

From these tables the following laws can be deduced:

1. In the metallic groups, I and II, the atomic volumes vary most.

2. In the intermediate groups, III and IV, and the a groups, the atomic volumes vary but little.

3. In the non-metallic groups, V, VI and VII, and the b groups, the atomic volumes vary least, approaching a constant for each group.

TABLE OF ATOMIC VOLUMES.

Group.	Element.	W.	D.	W / D	Old Value.	Authorities.
I.	Lithium	7.30	0.59	11.9	12	Stas; Bunsen.
	Sodium.....	23.05	0.97	23.8	24	Stas; Gay-Lussac and Thenard.
	Potassium ...	39.136	0.87	44.9	45	Stas; Gay-Lussac and Thenard.
	Rubidium....	85.48	1.52	56.4	56	Godeffroy; Bunsen.
	Cæsium	132.99	1.88	70 7	70	Bunsen; Stetterberg.
Ia.	Copper.....	63.604	8.94	7.0	8	Richards; various.
	Silver	107.93	10.53	10.25	10	Stas; Rose.
	Gold.....	197.16	19.33	10.20	10	Kruss; Rose.
II.	Beryllium....	9.1	1.85	4.9	6	Nilson and Pettersson; Humpidge.
	Magnesium ..	24.287	1.74	13.9	14	Burton and Vorce; Bunsen.
	Calcium	40.00	1.57	25.6	25	Erdmann and Marchand; Matthiessen.
II.	Strontium ...	87.6	2.54	33.9	34	Dumas; Matthiessen.
	Barium.....	137.0	3.75	36.5	36	Dumas; Kern.
IIa.	Zinc	65.34	7.10	9.2	10	Gladstone and Hibbert; Rammelsberg.
	Cadmium....	111.802	8.55	13.0	13	Partridge, Clarke; Schroder.
	Mercury.....	200.36	13.596	14.7	14	Erdmann & Marchand; Regnault.
IIb.	Iron	56.00	7.86	7.1	7	Erdmann and Marchand; various.
	Ruthenium ..	101.66	12.63	8.05	8	Joly.
	Osmium	191.18	22.48	8.50	8	Seubert; Deville, Joly and Vezes.
III.	Boron*.....	10.825	2.5?	4.13	4	Abrahall: Hampe.
	Aluminum ...	27.08	2.6	10.4	11	Mallet; Deville, Heeren.
	Scandium....	44.09	?	?	?	Nilson.
	Yttrium	89.02	?	?	?	Cleve.
	Lanthanum ..	138.2	6.1	22.6	22	Bettendorff, Brauner; Hillebrand and Norton.
IIIa.	Gallium	69.9	5.95	11.8	12	Boisbaudran.
	Indium.....	113.68	7 42	15.3	14	Bunsen; Winkler.
	Thallium	204.146	11.85	17.2	17	Crookes; De la Rive.
IV.	Carbon (ad.)	12.003	3.518	3.41	3	Roscoe; v. Baumhauer.
	Silicon (ad.).	28.4	2.39	11.8	11	Thorpe and Young; Winkler.
	Titanium	48.13	?	?	?	Thorpe.
	Zirconium ...	90.63	4.15?	21.8?	21	Bailey; Troost.
	Cerium.....	140.22	6.65	21.09	21	Brauner; Hillebrand and Norton.
	Thorium.....	232.4	11.0	21.13	?	Nilson and Kruss.
IVa.	Germanium ..	72.32	5.469	13.2	?	Winkler.
	Tin.....	118.08	7.29	16.2	16	Van der Plaats: Matthiessen.
	Lead.....	206.9	11.352	18.2	18	Stas; Reich.
IVb.	Cobalt.....	58.89	8.6?	6.89	6	Zimmermann; Rammelsberg.
	Rhodium	102.96	12.1?	8.50	8	Seubert and Kobbe; Deville and Debray.
	Iridium.....	193.18	22.42	8.97	8	Seubert, Joly; Deville and Debray.
V.	Nitrogen† ...	14.041	0.90	15.6	?	Stas; Wroblewski.

* The boron contains a trace of aluminum.

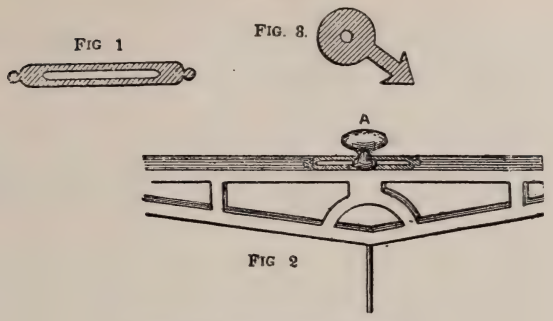
† The value of D for liquid nitrogen is probably too low; if taken as 14–16 that of oxygen—and the boiling points are almost the same—it becomes 0.98, giving a concordant atomic volume of 14.3.

TABLE OF ATOMIC VOLUMES—*Concluded.*

Group.	Element.	W.	D.	$\frac{W}{D}$	Old Value.	Authorities.
V.	Phosphorus (red)	31.025	2.2	14.1	13	Schrotter; Hittorf.
	Arsenic (Am.)	74.97	4.71	15.9	13	Dumas; Bettendorf.
	Antimony. ...	119.96	6.697	17.9	18	Cooke; Schroder.
	Bismuth	208.6	9.75	21.4	21	Marignac; Classen, Schroder.
Va.	Vanadium ...	51.21	5.5	9.31	9	Roscoe.
	Niobium.....	94.20	7.06	13.3	14	Marignac; Roscoe.
	Tantalum....	182.8	10.4	17.6	16	Marignac; Roscoe.
VI.	Oxygen.....	16	1.12	14.3	?	Berzelius; Olszewski.
	Sulphur (rhom.) ...	32.0626	2.075	15.45	15	Stas; Pisati.
	Selenium (cryst.) ...	79.070	4.5	17.57	17	Pettersson and Eckmann; Rammelsberg,
	Tellurium (cryst.) ...	124.85	6.246	19.99	20	Brauner; Priwosnik.
VIa.	Chromium ...	52.14	6.73	7.45	8	Rawson, Meinicke; Glatzel.
	Molybdenum..	96.08	8.6?	11.17?	11	L. Meyer; Debray.
	Uranium ...	239.4	18.7	12.79	13	Zimmermann.
VIb.	Nickel	58.1	8.9	6.53	6	Kruss and Schmidt; Schroder.
	Palladium ...	106.56	12.148	8.77	9	Keiser; Lowry.
	Platinum	194.83	21.5	9.06	9	Seubert; Deville and Debray.
VIc.	Erbium	166	?	?		Cleve.
	Tungsten....	184.08	18.77	9.83	10	Roscoe, Waddell; Waddell.
VII.	Fluorine.....	19.01	?	?		Dumas, Christensen, Moissan.
	Chlorine.....	35.45	1.46	24.3	25	Stas; Knietsch.
	Bromine.....	79.96	3.187	25.0	26	Stas; Pierre, Quincke, Van der Plaats.
	Iodine	126.86	4.95	25.6	25	Stas, Cooke, Gay-Lussac.
VIIa.	Manganese ..	55.1	7.39	7.45	6	Dewar & Scott, Marignac; Glatzel.

Balance-Adjusting Device.—Balances used for analytical work are sometimes, and prescription scales generally, lacking in means of adjustment, and to remedy this defect, where it exists, F. T. Green suggests a plan which is extremely simple and does not require special skill in its application. It is assumed that the beam has a centre screw (Fig. 2, A) on top, but if not, one can easily be added. The strip of brass (Fig. 1) is fixed beneath this screw in such a manner as to slide either to the right or left as required. When the point of adjustment is reached, the brass strip is firmly clamped by means of the centre screw. An alternative plan is to employ an arrow-shaped piece of brass (Fig. 3), which is also fixed by means of the centre screw, the method of adjustment being simply to turn the arrow to the right or left.—Jour. Am. Chem. Soc., xxi., 699.

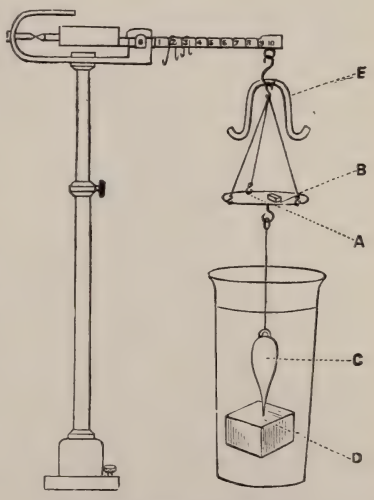
FIG. 17.



Balance-Adjusting Device.

The Westphal Balance for Waxes and Resins.—J. F. Liverseege.—The thermometer plummet was replaced by a light scale pan, A, with a hook underneath, to which was attached a spindle-shaped brass sinker, C, by means of a thin platinum wire. In taking a specific gravity, the sinker is immersed in a beaker of distilled water about 60° F., the 1.0 rider, E, is put on the hook; a piece of lead, B, put in the pan to about restore equilibrium, and the adjustment finished by the screw. The thermometer plummet weighed about 20 Gm., the brass sinker was 7 Gm., the 1.0 rider, 6½ Gm., leaving about 7 Gm. for the pan and the lead counterpoise. A cube of wax, D, weighing less than 6½ Gm. was cut smooth and the edges and corners cut off with a sharp knife, then polished with a duster, to prevent air-bubbles sticking to the wax. This cube was put on the pan and the weights adjusted to restore equilibrium, and then read. The brass sinker was stuck into the wax and lowered into the water, air-bubbles being brushed off and the riders again adjusted and read. A genuine bees-wax gave for the first reading 0.2615, then 1—0.2615 = 0.7385 was the weight of the wax. The second reading was 1.0240 and 1.0240—0.2615 = 0.7625 is loss of weight or volume of wax and specific gravity = $\frac{\text{weight}}{\text{volume}}$ or $\frac{0.7385}{0.7625} = 0.968$.

FIG. 18.



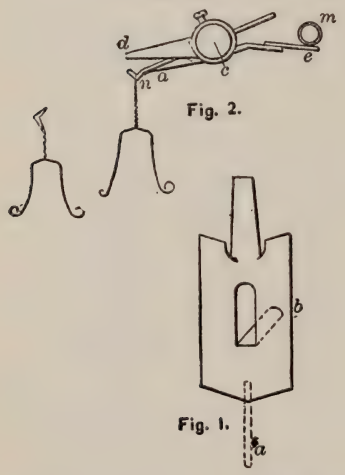
The Westphal Balance.

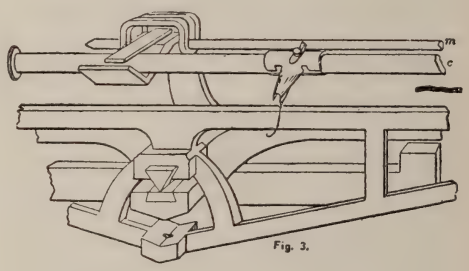
As specific gravity is relative, there is no necessity to convert the specific gravity weight (of which 1.0 = 6.48 Gm.) into absolute units.

If the solid is heavier than water, as resin, it may be determined in exactly the same way; but if necessary the point of the sinker is heated before sticking into the wax, etc., and allowed to cool before putting into the water. Thus with resin the first reading was 0.406, and the second, 0.957, and specific gravity $= \frac{1.000-0.406}{0.957-0.406} = 1.078$. If there are air spaces in the interior of the wax, etc., it is melted in a small porcelain dish, allowed to cool spontaneously, and the cube cut when cold.—Chem. News, 1894, 103.

Safety Attachment for Riders.—Chas. E. Parker devised an arrangement which appears to possess advantages, as regards simplicity, lightness and adaptability, over others employed in manipulating the weighing rider of balances. A light glass rod (in Fig. 3) is fixed parallel to the beam, behind and slightly above it. Then a piece of sheet brass, to which a piece of hair spring from a watch, *a*, is soldered (Fig. 1, *b*), is bent as shown in

FIG. 19. FIG. 20.





Safety Attachment for Riders.

Figs. 2 and 3, to form a sleeve upon the rod *c*, together with a prong *d*, in opposition to the hook *n*, Fig. 2, by which the rider is usually lifted, and an extension *e*, under the rod *m*, which thus limits the rotation of the sleeve and prong in one direction. The usual hook arrangement is thus converted into forceps, which are normally closed by the spring *a*, and secure the rider. When, by turning the rod *c*, the rider is lowered, contact between *m* and *e* checks the corresponding motion of the sleeve, thus opening the forceps, and, on continuing the movement, the rider is left hanging free from the beam. The tension of the spring should be sufficient to close the forceps upon releasing the rod *c*. If it should be, at any time, desirable to leave the rider upon the beam, all that is necessary is to bend

its loop as represented in the side sketch, Fig. 2.—Jour. Am. Chem. Soc., xvi., 764.

A New Laboratory Barometer.—L. Maquenne.—A portable syphon barometer, arranged to give corrected value of pressure with two readings and one addition of subtraction. The diameter of the reservoir is considerably greater than that of the tube ; the latter alone is graduated, and the graduations are arranged to allow for the change of level in the reservoir, so that the corrected height is given by a single reading. The temperature correction is given by an attached thermometer, graduated to show the various values of 750 (a—K)t, where 750 = mean barometer height in Mm., K and a = coefficient of expansion of glass and mercury, t = temperature. The neglect of the variation of this temperature correction with the height of the barometer involves a maximum error of only 0.1 Mm. The instrument is therefore available for all ordinary purposes.—Bull. Soc. Chim., 1894, 447.

An Improved Form of Barometer.—Collie has devised a barometer the essential feature of which is a capillary tube, instead of the usual wide bore. To obviate the difficulty that occurs with the ordinary mercurial barometer when it is necessary to move it about and invert it, Collie has devised at the bottom of the capillary tube a sort of glass reservoir to contain the surplus mercury, the upper part of which was provided with a tap. On turning this off, and so cutting off the connection with the atmosphere, the barometer can be inverted or laid down without any spilling of the mercury. The only drawback to the apparatus was that air got up the tube sometimes, and then was difficult to shake out and expel. To meet this, Collie devised a barometer divisible into two parts, the upper part of the tube fitted with a constriction that effectually prevents air globules passing. This part fits into the lower part of the tube by means of a ground joint, surrounded with a little cup of mercury that seals the union. Another distinctive feature is the scale. This is etched upon a mirror, and the barometer fixed in front. The advantage of this is that the level of the meniscus can be more accurately read than by the old method with a scale on the barometer tube. Collie claims that alterations of $\frac{1}{250}$ of an inch can be read without difficulty.—Jour. Chem. Soc., 1895, 128.

A New Barometer, showing minute variations of pressure, has been invented by C. O. Bartrum. About its middle the tube is expanded into a bulb, in which is the upper surface of the mercury. On the mercury rests a column of some light liquid. It is plain that a rise of mercury in the bulb will cause a much greater rise of the light fluid in the narrower upper tube, the amount depending on the sectional area of the bulb as compared with that of the upper tube. Small changes of pressure can, therefore, be read with ease, and the maker claims accuracy to $\frac{1}{2000}$ of an inch.—Amer. Drug. and Pharm. Rec., 1895, 4.

Applications of the Gas Baroscope.—G. Bodländer recommends the use of his gas baroscope in the analysis of commercial products. Carbonates are decomposed by excess of acid; bleaching powder, pyrolusite and potassium permanganate are decomposed by means of hydrogen peroxide. Carbon in iron is estimated by heating the sample with sulphuric and chromic acids, without previous separation of the carbon, in an Ullgrén's apparatus, which is directly connected with the baroscope. Oxalic acid or oxalates are best treated with a mixture of dilute sulphuric acid and potassium permanganate. Manganese may be estimated in steel by first treating the sample with nitric acid and potassium chlorate, and finally treating the manganic dioxide with sulphuric acid and oxalic acid. Potassium permanganate may in turn also be checked by means of sulphuric acid and oxalic acid.—Zeit. f. Angw. Chem., 1894, 425.

Poison Bottle.—A. Reed designs a poison bottle; its distinctive feature is a guard over the cork. The guard can, of course, be applied to any

FIG. 21.

Poison Bottle.

FIG. 22.

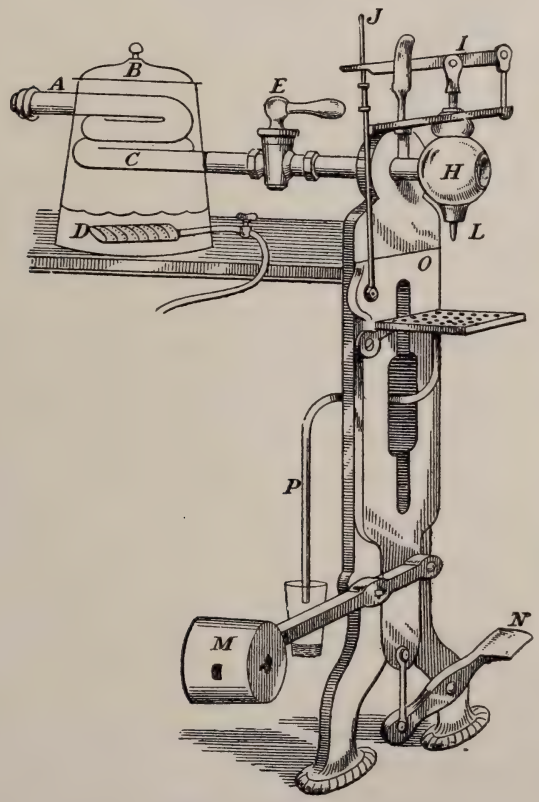
A New Wash Bottle with Valve.

bottle, and is equally effective on ordinary bottles and on those of eccentric shapes or unusual colors. In cases where people try to drink from a bottle the guard would be an effectual deterrent, even if the cork had been left out.—Chem. Drug., 1894, 857; (also in Jour. Soc. Chem., Ind., 1894, 788).

Wash Bottle.—G. C. Flint (Sci. American, lxxii., 5). The cut shows a large scale view of the valve. Its construction is obvious. The wire crosses a piece of rubber tubing. When the wire is depressed it squeezes the tubing against the wooden block on which it is mounted and thus closes it valve fashion. The middle finger controls the wire of the valve, allowing the free use of the first finger to direct the stream. When the bottle is reversed the middle finger also controls the stream issuing from the mouth tube. The air chamber ordinarily above the water is sufficient to eject the water for five or ten minutes, and with the hot-water bottle it is only necessary to shake the water, and the steam liberated is ample to force the water from the top. Another great advantage is that one runs no risk of burning the mouth, as the valve prevents the steam returning until the mouth is removed.

Roberts' Patent Filling Machine.—Roberts, in Brit. and Col. Drug.,

FIG. 23.



Roberts' Patent Filling Machine.

A, feeding pipe; *B*, cover for coil; *C*, copper coil; *D*, Bunsen burner; *E*, stop valve; *H*, valve; *I*, lever for valve; *J*, rod attached to slide to open valve; *K*, stand and dripper; *L*, nipple; *M*, balance; *N*, foot lever; *O*, slide which raises bottle and dripper; *P*, pipe to convey drippings.

August 31, 1894, p. 231. From the accompanying sketch, it will be noticed the machine consists of a 1-inch feeding pipe, which can be readily attached to the tank, tin or vessel containing the liquid it is desired to bottle. The pipe passes into a coil, covered with a sheet-iron jacket, lined with asbestos; beneath this is a specially-designed Bunsen burner, by means of which the liquid passing through the coil can be rendered thinner in cold weather if necessary. The coil is connected by a 1-inch pipe with the main upright stand, the pipe being divided by a stop valve to regulate the supply of liquid, and prevent waste by accident. The stand supports the main cut-off valve, to which nipples of various sizes, from ⅛ to ½ inch aperture, can be screwed in order to fit the neck of the bottle. This valve is controlled by a lever to which a rod is attached connecting it with a slide arrangement supported by the main upright stand. The slide is raised and lowered by means of a foot lever, which opens the valve to release the liquid on pressure, and closes it by means of a weighted balance. The connecting rod also carries two nuts, by means of which the opening of the valve may be regulated to a nicety. Affixed to the slide is a stand and dripper, from which a pipe runs to convey any drippings into a receptacle placed behind the machine. The pipes are lined with block tin, and the machine may be easily cleaned by passing steam, spirit, or any liquid through it, according to the nature of the body which has been used. It may even be employed for bottling liquids as viscid as diamond cement. The inventor claims that 1,500 ½-oz. bottles of glycerin or castor oil can thus be filled in the course of an hour, 4-oz. bottles being filled at the rate of 16 to 24 a minute

Salt-Mouth Bottle Scoop.—A. L. Moffitt (Amer. Drug. and Pharm. Rec., 1895, 176). The patent covers the combination, with stopper having a plain hollow center, of a removable semi-circular scoop formed of yielding material conforming to the hollow center formed with an inturned inner edge fitting the base of the hollow center, and with an external rib seating on the inner edge of the rim of the stopper.

FIG. 24.

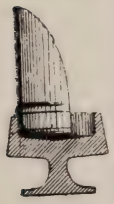


Fig 1

Salt-Mouth Bottle Scoop.

A New Safety Bottle Stopper.—W. B. Stevens (Ibid.) has taken out a patent that reads as follows:

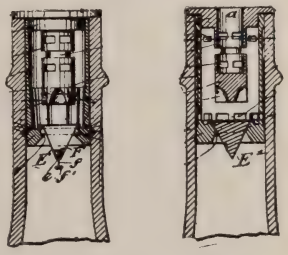
Claim.—1. A bottle stopper, consisting of a head having a discharge aperture, a guard cup arranged under said head and having side perforations, an internal body located below the guard cup and formed with a flaring valve seat and with a concentric annular guard groove around the upper end of the valve seat, said annular guard groove being of greater diameter than the guard cup and concentric therewith, and a conical valve adapted to fit in said valve seat below said groove, substantially as set forth.

2. Bottle stopper, consisting of a head having a discharge aperture, a

cage, said head and cage being adapted for permanent insertion into the neck of the bottle, and said cage having a valve seat formed around an opening in its lower end, a conical gravity valve of hollow form having an air opening in its lower end and an auxiliary valve for closing said air opening, and being provided with means for limiting its play, substantially as set forth.

3. A bottle stopper, consisting of a head having a discharge aperture, a cage, said head and cage being being adapted for permanent insertion into the neck of the bottle, and said cage having a valve seat formed around an opening in its lower end, a conical gravity valve of hollow form having an air opening in its lower end, and an auxiliary valve provided with a stem extending through said air opening and with a stop on said stem for limiting the play of the auxiliary valve, substantially as set forth.

FIG. 25.



Safety Bottle Stopper.

4. A bottle stopper, consisting of a head having a discharge aperture, a perforated guard cup located at the under side of said head, and having a closed lower end provided with side notches, a cage also on the under side of said head and inclosing said guard cup, said cage being provided with an internal annular guard shoulder located opposite said notches, and having a valve seat formed around an opening in its lower end, and a valve for closing said opening, substantially as set forth.

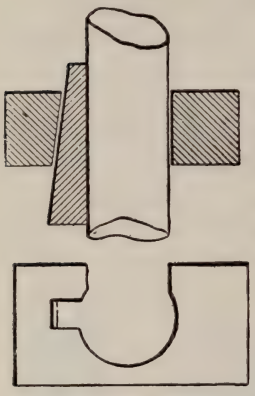
5. A bottle stopper, consisting of a head having a discharge aperture, a guard cup depending from the under side of said head and having side perforations, a cage abutting against the under side of said head and provided at its lower end with a flaring valve seat and with a concentric annular guard groove around the upper end of the valve seat, so that the latter is located below the groove, said annular guard groove being of greater diameter than the guard cup, and concentric with said guard cup, and a conical valve adapted to fit in said valve seat below said groove, substantially as set forth.

6. A bottle stopper, consisting of a head having a discharge aperture and a perforated guard cup arranged under said head, and having a closed lower end, and provided with side notches, substantially as set forth.

Convenient Burette Clamp.—Clarence Quinan made a convenient burette clamp in accordance with the accompanying sketch, a simple wedge holding the tube in position. The holder is made preferably of maple, and the wedge of hickory or other hard wood. The surface of the latter should be slightly curved to ensure accurate contact, and cork is found unnecessary on the bearing parts, since very slight pressure on the

upper end of the wedge causes the tube to be held with great rigidity.—Pharm. Jour. Trans., 1895, 647; Jour. Am. Chem. Soc., xvi., 719.

Fig. 26.

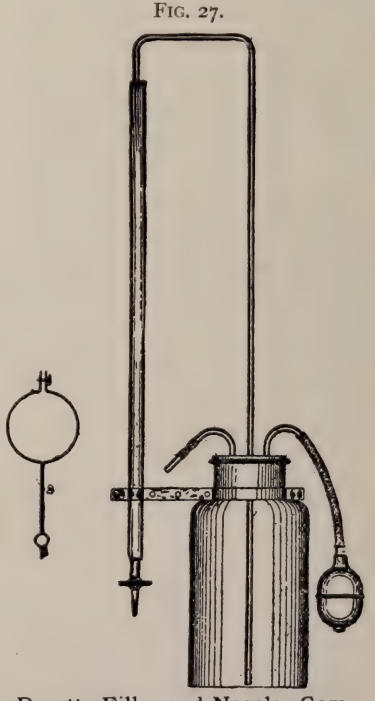


Burette Clamp.

To Remove Air Bubbles from Burettes.—A writer calls attention to a little trick for removing air bubbles from the lower part of burettes. The proposition is to curve the flexible outlet upward, when the descending fluid will easily push out every trace of air in the tube. The more common method of forcing a sharp stream through the perpendicular tube is wasteful and not always successful.—West. Drug., 1895, 27.

Burette Filler and Nessler Comparator.—A. P. Hallock designed an arrangement for filling burettes. A bottle containing at least 2 Lit. is fitted with a rubber cork and a brass collar which carries a burette clamp—the collar and clamp being made of two strips of brass, bent as shown to the left of the illustration, and soldered or riveted together at S. The ends are turned outwards and fitted with thumb-screws that serve to firmly clamp the circles. To fill the burette a finger is placed on the opening of the short bent tube to the left, and the India rubber bulb is then squeezed so that the air in the bottle is compressed and the solution forced into the burette by means of the long tube. The latter is kept in position by a cork with a small slit on one side, or fitting loosely in the burette, and the end of it is slightly constricted and cut off at the zero line of the graduation. When the burette is full the air pressure is released by removing the finger from the short tube, and all the liquid above the zero mark then syphons back into the stock bottle.

Fig. 27.



Burette Filler and Nessler Comparator.

The Nessler comparator, as improved by Hallock, has the form of a large Slack test-tube rack with ten or twelve holes. A strip of milk glass extends from end to end at the bottom, being held in place by small pieces of India rubber fastened at each side by small screws, and so close

to the base that the glass can just be forced in between. A similar strip of clear glass rests on cleats at the side of the rack, about two inches above the milk glass, being fixed in the same manner as the latter, and upon this clear glass the Nessler tubes stand. The standards are placed in alternate holes in the rack, the intervening spaces serving for the tubes to be compared,which need not be raised in order to make the comparison, whilst the whole apparatus is very readily cleaned and kept in order.—Jour. Am. Chem. Soc., xxi., 870.

Argand Burner and Auer Burner.—In some comparative researches on the products of combustion of coal gas as yielded by these burners, N. Grehant concludes that from a sanitary point of view it is very important to allow the products of combustion of coal gas to escape into the open air, especially if derived from the Auer burner.—Comp. rend., cxix., 146; Chem. News, 1894, 83.

Improved Bunsen Burner.—The gas passes through an opening in the apex of a small cone situated at the lower end of a tube which is open at the top only. A second tube, closed at one end, is telescoped over the former, but through the closed end there passes a small tube, open at both ends, the lower (longer) end of which extends nearly down to the gas cone. The opening for admitting air is located in the upper end of the exterior tube and is provided with a regulator. The air, it will be seen, is obliged to pass downward, mingles with the gas at the latter's exit, whereupon the mixtures pass up through the central tube constituting the burner. Complete combustion is said to be effected, while the flame never can be driven back.—West. Drug., 1895, 61.

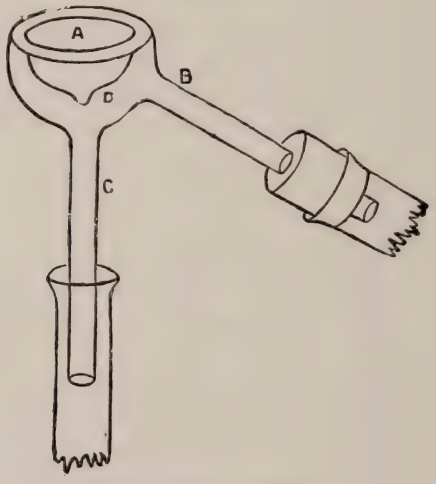
Centrifugal Machine in Sputum Examination.—W. G. Hudson advocates the use of the centrifugal machine in the examination of sputum for tubercle bacilli. Where possible, he secures all the sputum raised in twenty-four hours, and adds some potassium hydrate solution; this, with the aid of heat, dissolves any lumps that may be present, and after a time the mixture becomes quite thin. It is then diluted with water so as to lower the specific gravity, and introduced into a large centrifugal machine. The latter is then run at a high speed for a half hour, which throws down all solid particles, bacteria included, and the specimen to be examined is then taken, by means of a pipette, from the bottom of the conical part of the tube. The author reports a case in which a very uncertain diagnosis was made clear by this means. The ordinary examinations of the sputum had given in the first instance negative results; a repetition of the examination showed only two bacilli, these being in one of eight preparations made, and these, it was insisted by one examiner, were an accidental contamination. By the use of the method above mentioned, however, the presence of the bacilli in the lungs of the patient was sufficiently demonstrated. The treatment then given brought about much improvement,

but an accidental injury to the chest caused the onset of the disease in so virulent a form that death ensued six weeks after.—Drug. Circ., 1895, 88.

A Centrifugal Apparatus.—G. W. A. Kahlbaum. The apparatus consists of two test-tubes, the one sliding in the other. The inner tube has its end cut off, and closed by a piece of platinum gauze melted on to the glass. The crystalline magma is placed in the inner tube, which is then closed with a cork, and the whole apparatus is whirled round at the end of a string attached to the open end of the outer test-tube.—Ber. d. Chem. Ges., 1895, 391.

A Test-tube Condenser.—C. J. Brooks. The accompanying sketch of a small condenser for use with test tubes will be found useful for separating volatile substances on a small scale. The glass bulb, A, has a reservoir, D,

FIG. 28.



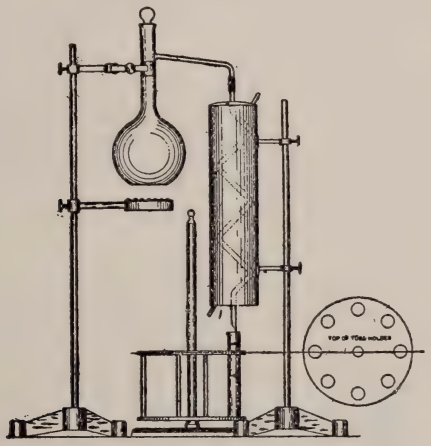
Test-Tube Condenser.

in which the cooling medium is placed, on the cold inner surface of which the vapor will condense as it is driven from the test-tube through the tube B. The condensed liquid then falls through tube C, and is collected in another test-tube.—Chem. News, 1894, 239.

Condenser and Revolving Nessler Stand.—In the condenser adapted by E. W. Martin, the three-eighths inch block-tin pipe forming the condenser tube is bent in a zigzag shape, as affording a more even flow of the distillate than the conventional helix. The cylindrical copper jacket enclosing it is about fifteen inches long and four inches in diameter, and is closed at both top and bottom with discs that are arched upward. The effect of this at the lower fend is to prevent contamination of the distillate with any drip from the outside. To insure the more certain delivery of the distillate the lower end of the tin tube is cut aslant. In case of water analysis, distil-

lation, etc., a stoppered glass flask, with side neck, is used, the end of the latter being bent vertically downward, as shown, and thrust deeply into the condenser tube, being held in position by a short piece of rubber tubing. Martin's revolving Nessler rack is represented in the same illustration, and as will be seen, consists simply of two circles of thin board connected by light strips of wood, the upper circle being perforated for eight or ten

FIG. 29.



Condenser and Revolving Nessler Stand.

tubes, the lower one partly perforated to form shallow sockets. The whole revolves about an upright set in a base, and if one tube in the rack be placed in position to receive the drip from the condenser, the others can be brought successively into the same position, and the order in which the fractions of the distillate are taken is easily preserved.—Jour. Am. Chem. Soc., xvi., 871.

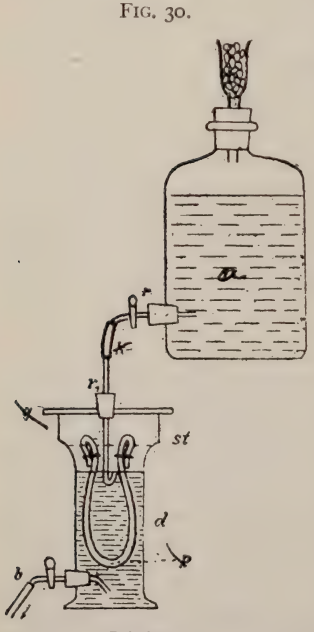
New India Rubber Cork.—A French firm has recently introduced a new form of India-rubber cork. The rubber is hollow and at one end a hard disc is attached, through a perforation in which a rod passes to the bottom of the cork. On pressing the rod the stopper elongates, and can be introduced into the neck of the bottle ; on releasing the pressure the stopper contracts in length but increases in diameter, and will be firmly held by the neck, which, of course, should be slightly smaller than the cork.—Apoth. Zeit., 1895, 332.

Crystals Collecting on the Surface of a Solution Lighter than Themselves.—Lecoq de Boisbaudran.—If we place fragments of a substance heavier than the solution, some near the surface and others at the bottom of a saturated solution of the substance, it is observed that the upper fragments do not tend to disappear, whilst the lower fragments increase. This effect is commonly produced when the solution is not merely saturated with the

substance of the fragments, but is besides saturated, or approximately saturated, with other substances. Still, this is not always the case, as it appears from the following experiment: We saturate water at first and simultaneously with sodium carbonate, and thiosulphate at about 20°. We then saturate the solution at the same temperature with crystalline sodium monosulphide, of which it dissolves considerable quantities. The liquid is then poured into a hydrometer jar from 0.10 to 0.15 metre in depth), at the bottom of which we place a certain quantity of crystalline Na_2S. We further place a very small fragment of Na_2S upon a support very little below the surface of the liquid. After the lapse of some days or weeks all the Na_2S is collected upon the upper support, around the fragment which has been placed there. It is to be remarked that crystalline Na_2S is heavier than the complex solution. This effect may be explained by admitting for the solution containing the three salts of sodium a density inferior to that of the two salts, carbonate and thiosulphate.—Compt. rend., vol. cxix., No. 7.

Dialyser.—It consists of a vessel containing distilled water (*a*), which is closed above (*w*) by absorbent cotton. The water passes by means of tubes (*r* and *r*) into the dialyser proper (*d*) containing the parchment paper suspended by means of the glass rod (*s t*), to which it is bound. The dialysis proceeds with regularity and ease, and the solution containing salts escapes through *b*.—Pharm. Centralh., 1894, 719.

FIG. 30.



Dialyser.

Apparatus for Distillation in a Vacuum.—F. Anderlini. A somewhat complicated glass apparatus for use in distillation under reduced pressure is described and figured. It consists of a bell jar, into the neck of which is ground a stopper, through which passes an adapter for taking the end of the condenser. The bell jar contains the vessels for collecting the distillate, and may be turned round in order to direct the separate fractions into the proper receptacles, the stopper remaining fixed. The author employs Wurtz flasks having a small auxiliary bulb in the neck and a stem of some 50–60 Cm. in length. Instead of filling the distilling flask with glass wool, as recommended by Angeli, the author prefers to stand a bundle of glass threads in the bulb, keeping them in place by a spiral of platinum wire contained in the neck of the flask.—Gazzetta, 1894, 190; Jour. Chem. Soc., 1894, 311.

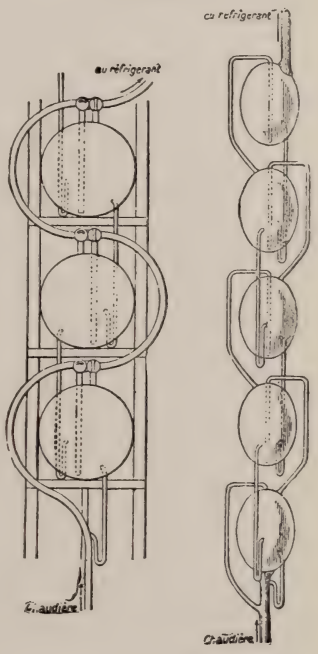
Varenne's Fractionation Apparatus.—For chemical laboratories the apparatus may be made of glass, and will permit of easily effecting the fractional distillation of liquids at very approximate points of ebullition. For the industries it is constructed of copper or iron. It is well adapted for the delicate distillation of benzin or toluene, and it is applicable to all distillations, whatever be the boiling points of the liquids. It suffices to vary the number of the bulbs according as the liquids boil at more or less elevated temperatures. It is principally in the rectification of alcohols that this apparatus gives good results.

The following, according to the communication made by the inventor to the Chemical Society of Paris, is a comparative table of the rendering of the different apparatus:

Savalle apparatus	1.580
Le Bel-Henninger apparatus	1.560
Claudan-Morin apparatus	1.530
E. Varenne apparatus	1.083
Theoretical coefficient	1.025

—West. Drug., 1894, 456.

FIG. 31.



Apparatus for Fractional Distillation.

Apparatus for Fractional Distillation under very Low Pressure.—G. W. A. Kahlbaum. This apparatus is designed for distillations under a pressure of say 3 Mm., the mercury pump being used; it is illustrated by means of a sketch. All the joints are made air-tight with mercury seals, and the receiver has a slightly novel construction, the drops falling into little cups attached to a central vertical tube (which can be turned on its axis), down which they flow, and by which they are directed into flasks attached underneath.—Ber. d. Chem. Ges., 1895, 392.

Separation of Three Liquids by Fractional Distillation.—F. R. Barrell, G. L. Thomas and S. Young calculate curves representing graphically the progress of the distillation of three liquids on the assumption that the proportion of the three substances in the vapor forming the instantaneous distillate is the same as that of the weights of the three substances in the residue in the still, each weight being multiplied by a suitable constant, which is roughly proportional to the vapor pressure of the corresponding liquid.

To test the validity of the results arrived at, a mixture of 200 C.c. of methylic acetate, 250 C.c. of ethylic acetate and 200 C.c. of propylic ace-

tate was distilled from a flask provided with a still-head 1 meter long. After twenty-six preliminary fractionations the liquid had been divided into two series of fractions, one series containing practically only ethylic and methylic acetates, the other series ethylic and propylic acetates. Six further fractionations separated the individual ethereal salts. The quantities of pure methylic, ethylic, and propylic acetates finally obtained were, respectively, equal to 48, 53 and 72 per cent. of the quantities originally taken.—Phil. Mag., 1894, 8.

The Size of Drops.—J. B. Hannay appears to have obtained experimental verification of Tait's conclusion, arrived at some years ago. Thus the size of the drop does not depend upon the weight of the liquid, but is proportional to the diameter of the delivery tube, whilst its separation is regulated by surface tension rather than by cohesion. In the experiments the disturbing element of viscosity was removed by causing a given liquid to drop into another of different specific gravity. The separated particles of water were allowed to rise upwards in the oil. It was further ascertained that when water was dropped in an atmosphere of benzene vapour the drops formed were much smaller than when the surrounding medium was ordinary air.—Pharm. Jour. Trans., 1895, 1018.

Improved Drying Oven.—W. Hoffmeister.—The oven is designed for drying substances in a current of illuminating or other gas, or under reduced pressure. The form is that of an ordinary rectangular chest, but the door is made to close air-tight. The gas with which it is to be filled is introduced by a copper spiral pierced with numerous holes. Openings at the top of the chest allow of the insertion of a thermometer and a tube, by which connection may be made either with the burner, which is to consume the gas after passing through the oven, or with a pump, by which, when the inlet tube is closed, the pressure in the interior may be lowered. —Zeit. f. Anal. Chem., 1894, 437.

Modifications of Beckmann's Ebullioscopic Apparatus.—C. E. Linebarger.—To obviate the difficulties hitherto experienced when introducing the substance into the boiling solvent in the Beckmann ebullioscopic tube, the author does away with the side tube, fuses a piece of wider tubing on to the mouth and fits this with a cork to take the thermometer and the end of the condensing tube, which is only 190 mm. long and 12 mm. in diameter, and being set upright, permits of any substance being dropped into the boiling solvent without risk of adherence to the sides. To minimize any escape of solvent during an experiment, the author suspends a small gilded copper surface condenser in the condensing tube, or closes the top of the latter with a cork carrying a small tube closed below and terminating above the cork with a capillary; in this tube some of the solvent is placed, and in the side of the tube, just above the liquid and below the cork, is a small perforation, so that any vapor escaping condensation

has to pass by the perforation through this tube and capillary before reaching the open air, and is, therefore, effectually condensed by the atmosphere already saturated with the vapor, and overflowing through the perforation, is returned to the solution.—Chem. News, 1894, 279; Jour. Chem. Soc., 1894, 408.

A New Element.—Bayer thinks he has discovered a new element among the by-products left after the extraction of aluminum from red bauxite. The liquors contain chiefly sodium carbonate and sulphate, together with chromic, vanadic, molybdic, silicic, arsenic, phosphoric and tungstic acids, as well as alumina, magnesia, lime, etc. The supposed element exists in the liquors in the form of an acid which is soluble in water and forms yellow crystals. The solution is not precipitated by sulphuretted hydrogen, but may be obtained on evaporating its solutions as a bluish violet oxide, which subsequently becomes further oxidized and lemon yellow in color. The latter compound, which probably corresponds to the formula R_2O_5, has marked acid tendencies, and forms characteristic compounds with different bases. The spectrum of the new body exhibits characteristic lines in the green, blue and violet, and it is suggested that Bayer has discovered one of the missing elements predicted by Mendeléeff in the nitrogen-phosphorus group.—Bull. de la Soc. Chim. [3], xi., 1155.

Argon.—Recently attention has been called to a constituent of the atmosphere which has been long overlooked. In 1894 Lord Rayleigh, in a paper read before the Royal Society "On an Anomaly encountered in Determinations of the Density of Nitrogen Gas," showed that nitrogen extracted from chemical compounds is about 0.5 per cent. lighter than "atmospheric nitrogen." When the discrepancy of weights was first encountered, attempts were naturally made to explain it by contamination with well-known impurities as hydrogen, or as due to the dissociation of nitrogen molecules, N_2, into detached atoms. But careful experiments lasting for months demonstrated that "chemical nitrogen" had a density of 2.299 and that "atmospheric nitrogen" possessed a density of 2.310. Rayleigh then tried the process of diffusion in order to determine if the "atmospheric nitrogen" was pure or a mixture of components of different densities, and later proved that the atmosphere contains a previously unknown gas.

What adds considerable interest to these experiments is the fact that in 1785 Cavendish, in a paper on "Experiments on Air," calls attention to the fact that the residue left on the withdrawal of oxygen, water, and carbon dioxide from air is identical with the constituent of nitric acid. He moreover showed that phlogisticated air (nitrogen), as he termed it, was not the sole residue after removal of the bodies above named, and he had actually experimented by passing the electric spark through a mixture of "phlogisticated" and "dephlogisticated air," to see if there was anything which did not combine with "dephlogisticated air" as he had found "phlogisticated air" did. He did get an uncombinable portion in his

wonderful investigation, and concludes that if there is any part of the "phlogisticated air" which cannot be made into nitrous acid it is not more than $\frac{1}{120}$ part of the whole.

Wm. Ramsay and Lord Rayleigh have further experimented during the past year and have succeeded in withdrawing nitrogen from air by means of red-hot magnesium. They passed "atmospheric nitrogen" backwards and forwards over red-hot magnesium from one large gas holder to another, to obtain a considerable quantity of the heavier gas. In the course of ten days about 1,500 C.c. were collected and transferred gradually to a mercury gas holder, from which the gas was passed over soda-lime, P_2O_5, magnesium at a red heat, copper oxide, soda-lime and P_2O_5 into a second mercury gas holder. The volume was reduced to about 200 C.c. At this point the density was 19.09 and it was examined by means of the spectrum, and though showing nitrogen bands, showed many other lines which were not recognizable as belonging to any known element. They have called this element *Argon* from *an*, without, and *ergon*, energy. It has refused to combine with any known reagent.

The authors then proved by atmolysis that the new element was present in the air, and they at once instituted rather laborious negative experiments, and proved thereby that the new element is not derived from nitrogen from chemical sources. They then separated the new element on a large scale from 100 to 150 litres of atmospheric nitrogen and determined the density as compared with hydrogen by several methods, and found 19.90 to be probably the figure. This might be fixed as the molecular weight, did not certain considerations lead to the supposition that the molecule may be like mercury, monatomic, which would make the molecular and therefore atomic weight double the density.

Wm. Crookes examined the spectrum of argon as seen in a vacuum tube through which the electric spark was passed. Two lines are especially characteristic; they are less refrangible than the red lines of hydrogen or lithium, and serve well to identify the gas in this way. Besides these red lines, a bright yellow line, more refrangible than the sodium line recurs, as also five bright green lines, besides a number of less intensity.

Argon is about $2\frac{1}{2}$ times as soluble in water as nitrogen, and possesses approximately the same solubility as oxygen. It is interesting to note that K. Olszewski, of the University of Cracow, worked with 300 C.c. of gas prepared by the authors, and has obtained the critical temperature, boiling point, freezing point, densities of the gas and liquid. In comparing the physical constants of argon with so-called permanent gases, *Argon* belongs to the so-called "permanent" gases, and as regards difficulty in liquefying it, it occupies the fourth place, viz.: between CO and O_2. Its behaviour in liquefaction places it nearest to oxygen, but it differs entirely from oxygen in being solidifiable; as is well known, oxygen has not been made to assume a solid state. Its unexpectedly low critical temperature

and boiling point seem to have some relation to its unexpectedly simple molecular constitution.—Chem. News, 1895 (Feb. 1), p. 51.

New Automatic Still and Extraction Apparatus.—This apparatus consists of two cylinders (Fig. II), one of which fits into the other. For the distillation of water, the liquid is poured into the lower cylinder up to the level of the tap *L*, and then heated. The water supply is connected with the tube *E*, and the cold water allowed to run into the refrigerator in the upper cylinder. On heating, the steam given off is condensed on the cone *BB*, and the drops of distilled water trickling down collect in a gutter and run out by the tube *C*. By opening the tap *E*, so as to allow water from the refrigerator to flow into the funnel *C*, the level at *A* is kept constant, any excess overflowing from the tap *L*, and the operation thus becomes

FIG. 32.

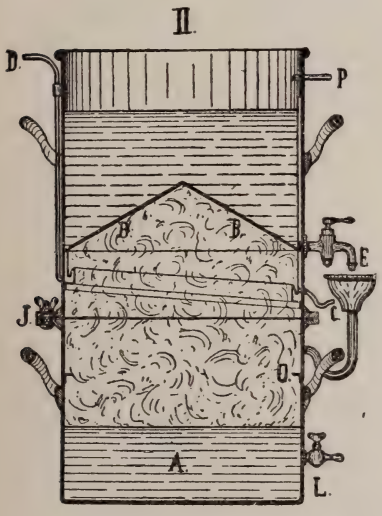
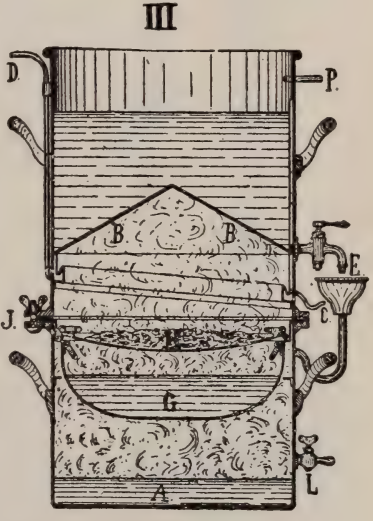


FIG. 33.



New Automatic Still and Extraction Apparatus.

automatic. If perfumed waters are required a sieve *H* (Fig. III) is placed on the supports *O* (see Fig. II) and the flowers, etc., are placed thereon, so that the steam extracts the perfume in its upward passage. Alcohol, ether and other volatile fluids may be distilled by inserting the water bath *G* (Fig. III) in the lower cylinder, connecting a funnel (not shown in illustration) above the flange *J* with a vessel containing the liquid, and then proceeding as before.—Pharm. Jour. Trans., 1895 (March 16), 99.

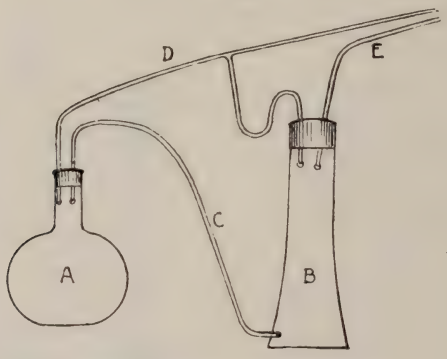
Extraction Apparatus.—L. Etaix.—The essential feature of this apparatus is the siphon tube, the short arm of which opens at the bottom of the extraction vessel, the long arm into the lower flask, the syphon being protected by an outer tube. By this means the solvent used alternately half fills the extraction vessel, so as to cover the substance to be extracted, and

is then automatically drawn off into the lower vessel. It may be used for cold or boiling extractions.—Bull. Soc. Chim., 1894, 259.

Extraction Apparatus.—C. E. Parker (Am. Drug. and Pharm. Rec., 1895, 391). The apparatus is designed more especially for pharmaceutical purposes, in particular for extracting alkaloids, etc., from drugs prior to shaking out and estimating in the usual way. For this purpose it works well, being automatic and continuous, and requiring but little attention.

The method of working is at once evident from the figure. The solvent is placed in A and the marc in B, the two tubes E and D passing into an inverted condenser. When the solvent is heated it volatilizes and passes into D, where it is condensed and passed into the vessel B contain-

FIG. 34.



Parker's Extraction Apparatus.

ing the marc, through which it slowly percolates. Before starting, however, sufficient liquid must be placed in B to cover the metal of the tube C, through which the saturated solvent is siphoned back to the flask A. The process is continued till the marc is exhausted, when the solution is removed from A and the alkaloids, etc., shaken out in the usual way.

Exhausting Drugs with Salt.—Bernegau employs a two per cent. salt solution for exhausting coffee, kola and ergot. A solution of salt exhausts these drugs more rapidly than water alone, and produces better extracts.—Pharm. Rundsch., 1894, 137; Pharm. Zeit., 1895, 309. (See also Extract of Ergot.)

Rapid Filtering Apparatus.—G. A. James designs a simple and effective filtering apparatus. A glass tube of any convenient length, having a contraction near its upper end, is connected with the small end of the funnel by a short piece of rubber tube. The lower end of the glass tube is inserted in the bottle or other vessel which receives the filtered liquid, and the funnel is supported by a filter stand (not shown). The contraction in this case is made by flattening the tube so that its sides approach each other to within a very short distance, say $\frac{1}{100}$ of an inch. This contraction

prevents air from entering the part of the tube below the contraction, and thus a solid column of liquid is maintained below the contraction. The liquid by its weight produces a partial vacuum in the tube, and thus allows the air pressure on the liquid in the funnel to force the liquid through the filtering medium. The rapidity with which the filtering is accomplished depends upon the length of the tube, other things being equal. In Fig. 2 is shown a modification of the apparatus, in which the tube is contracted evenly all around in two places, leaving a small circular opening instead of a flat one. Experience shows the flattened tube to be preferable.—Scientific American; Pharm. Jour. Trans., 1894, 174.

FIG. 35.

Rapid Filtering Apparatus.

Nitro-Cellulose Filter Paper.—E. Cramer recommends the use of filter paper, consisting wholly or partially of nitro-cellulose, in operations requiring incineration. Such papers offer the additional advantage of filtering very rapidly, and of not being as hygroscopic as ordinary filter papers.—Zeitschr. f. Angew. Chem., 1894, 269.

A Useful Laboratory Filter.—A. Green (Chem. and Drug., 1895, 340): The filter was originally devised to minimize oxidation, and in this respect proved an unqualified success; it was also found very useful in filtering strong solutions of quinine in phosphoric acid, which went indifferently through flannel or twill, and refused absolutely to go through paper. The whole apparatus is in principle a siphon, the filter itself being simply an alteration in the limb of the siphon, adapted to hold the filtering medium.

The apparatus is constructed as follows: A glass cylinder is taken, about 12 inches long and 1½ inches in diameter. The supply tube, 1¼ inches diameter, is connected to the cylinder by a rubber bung, and the exit tube, ⅜ inch in diameter, is connected in a similar way. It is important that the supply tube should be of wider bore than the exit tube, otherwise the limbs of the syphon will not be full. The filter is charged as follows: The exit tube having been fitted to the cylinder, a few pieces of clean broken glass are inserted, then a wad of cotton wool, not tightly packed, to make a layer about ½ inch deep; then a little glass wool and more cotton wool, as before; glass wool again, and then a layer of paper pulp.

The central space of the cylinder is filled with eight or nine small clean glass stoppers (ounce-vial size), or glass beads if preferred. This prevents too much compression of the different layers. Paper-pulp is added next to form a layer 1 inch deep, solid, but not tightly packed, a little glass wool over this, then another layer of paper-pulp, and finally a little more glass wool, and if there is room, a pad of cotton wool. It is possible, by using

FIG. 36.

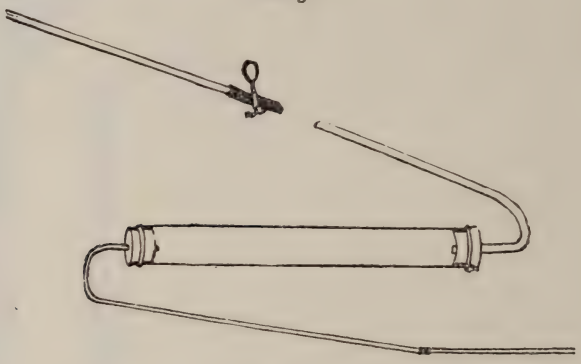


FIG. 1.

New Laboratory Filter.

the arrangement described, to filter 26 or 27 gallons in a night without any loss, but care must be taken that the receiving vessel is of sufficient capacity to contain the whole of the filtered liquor, or disaster will ensue.

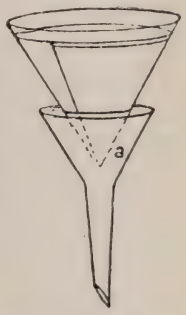
The following are some of the advantages in favor of the filter: Exposure to the atmosphere is reduced to a minimum; heavy sediments can be avoided by raising the limb of the siphon, and so preventing clogging; there is no disturbance of the filter by addition of more liquid. It is self-feeding, and with suitable vessels requires no attention when once started; consequently filtration may proceed over night, and the filter may be filled with any suitable material, such as charcoal, kieselguhr, etc., and can be easily changed or cleaned when necessary. Lastly, there is no waste of liquid.

Simple Substitute for a Separator Funnel.—D. Holde.—An ordinary bottle or flask is fitted with a cork, through which pass two tubes. One of these, terminating inside, level with the cork, is furnished with a stopcock or pinch-clamp. The other, reaching to the bottom of the vessel, is there narrowed to a point, and serves to admit air. After shaking, the vessel is inverted for drawing off the two layers separately.—Zeit. f. anal. Chem., 1895, 54.

Funnel for Analytical Work.—R. Müncke (Pharm. Centralh., 1895, 95), has devised a funnel for rapid filtration in analytical work, the special feature of which is that it leaves the point of the filter placed in it entirely

free, thus insuring a much more rapid filtration than if the entire surface of the filter was in contact with the sides of the funnel, as is the case in the use of the old style funnel. The new funnel is shown in Fig. 37.

FIG. 37.



Funnel for Analytical Work.

Substitute for a Funnel.—A. M. Edwards dispenses with the use of a funnel in cases of difficult filtration through paper, replacing it by a piece of celluloid in which numerous holes have been punched. This is bent into the shape of a funnel and supported in a retort stand ring. When not in use the celluloid can be washed and put away flat like a piece of paper.—Chem. News, lxxi., 40.

The Cyanogen Flame.—In an article on the structure and chemistry of the cyanogen flame, A. Smithells and F. Dent find that the differentiation of the ordinary cyanogen flame into an inner cone of a peach blossom tint and an outer one of a blue tint, corresponds to two stages in the oxidation of the carbon, carbon monoxide being formed in the first cone and carbon dioxide in the second one. The greenish fringe to the outer cone is attributed to small quantities of oxides of nitrogen.—Jour. Chem. Soc., 1894, 603.

The Influence of CO_2 on Flames.—From experiments made with naked flames, results have been obtained showing that the flames of liquid hydrocarbons burnt from wicks require a proportion of carbon dioxide to air averaging about fifteen per cent. of the mixture, for the extinction of ordinary flames. A coal-gas flame burnt from a jet requires as much as thirty-three per cent of carbon dioxide in the air to extinguish it; while the hydrogen flame requires no less than fifty-eight per cent. It is of interest to note that the flame of fire-damp is easily extinguished, requiring the presence of only ten per cent. of the extinctive gas.—Chem. Trade. Jour.; Amer. Drug. and Pharm. Rec., 1894.

Fluorescence.—E. Buckingham.—Experiments were made to establish a connection between the phenomena of fluorescence and the ions present in the liquid. In the case of eosin, which contains acidic hydrogen, dilution increases the fluorescence; the addition of strong acids, that is, of hydrogen ions, caused it to diminish, as did also neutral salts if in sufficient quantity; strong alkalies also caused a decrease, probably owing to the formation of slightly dissociated salts. A few observations were made with β-naphthylamine-disulphonic acid, $[(SO_3H)_2 : NH_2 = 1 : 4' : 2]$, and then a large number with quinine. This compound being a feeble base, the effect of alkalies on solutions of its salts should be to diminish the fluorescence, which should be increased by acids and strongly dissociated neutral salts, and the observed results were as expected. The experiments also show that the bivalent quinine ion, as in $Q.SO_4H_2$, is more strongly fluor-

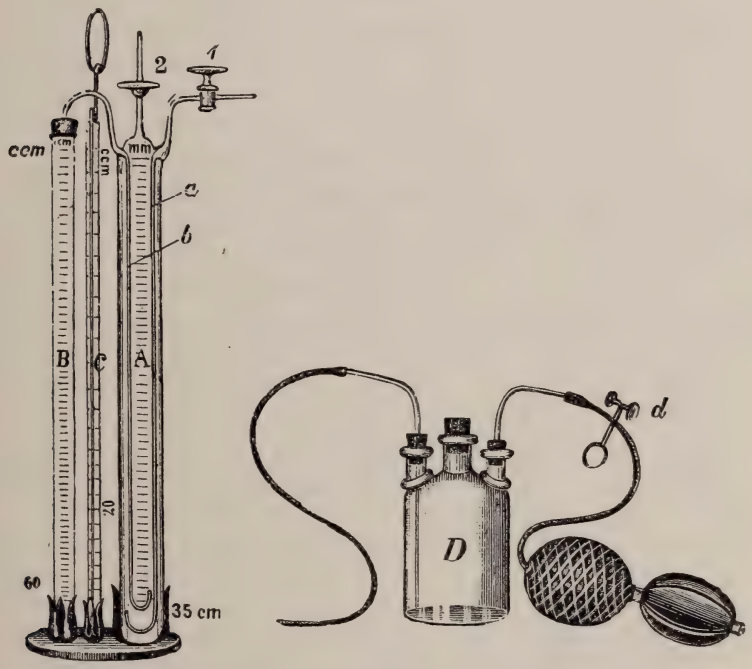
escent than the univalent ions as in $Q.HNO_3$. Halogen ions exert a peculiar diminishing influence, which, although well marked and regular, the author is unable to explain. He considers, however, his results certainly indicate that fluorescence is an ionic phenomenon.—Zeit. f. physikal. Chem., 1894, 129.

Fusibility of Mixtures of Salts.—H. Le Chatelier.—Mixtures of salts capable of forming double salts correspond with aqueous solutions of salts which form hydrates, and the author has previously shown that in the case of the latter, each different compound or each different state of the same compound has a distinct curve of solubility. It follows that salts capable of forming a single definite compound will have a curve of fusibility consisting of three parts, one corresponding to the crystallization of one of the salts, the second to the crystallization of the other simple salt, and the third to the crystallization of the double salt. The curves of the two single salts have the same form as if the double salt did not exist. The curve of the latter necessarily has a different form, its highest temperature of crystallization is that which corresponds with its simple fusion ; but this diminishes gradually when increasing quantities of one or other of the constituent salts are added, and tends, in the two cases, to approach absolute zero when the proportion of one or the other of the single salts tends to become nil.—Compt. rend., 1894, 800.

A Simple Apparatus for Measuring Gases.—C. Kippenberger.—The apparatus consists of a cylinder, A, provided with a calibrated scale divided to 0.1 Cm. Inside are placed two bent tubes, a and b, which are so constructed that they both have the same capacity, and that when the apparatus is filled the meniscus of the liquid in each is in the same line with that in the stop-cock, 2. B is a cylinder calibrated to 0.1 C.c., and C a similar one, though somewhat narrower, and consequently holding less liquid, and also having an inside tube calibrated to 0.1 C.c. and closed by means of an India-rubber tube. The apparatus is filled by connecting the tube b with a Woulff's bottle by means of an india-rubber tube. The Woulff's bottle is filled with any suitable liquid which is forced out by means of the rubber force pump. The apparatus is intended for collecting any gas in the cylinder A. The tube A must be first emptied by rapidly passing through it a current of a gas soluble in the liquid. The gas to be measured is then introduced and removed from the generating flask by a further current of the soluble gas. If, for instance, hydrogen is to be estimated in presence of carbonic anhydride, the cylinder A is filled with aqueous potash, which absorbs the carbonic anhydride, whilst the hydrogen is collecting on the top, displacing an equal volume of liquid which, after being expelled through the tube b, is measured in B. When great accuracy is wanted the tube C is used ; as soon as the gas has been collected in the cylinder A, the tube b is connected with the inner tube of C, which must be completely immersed in water or any other suitable liquid. If now

from any cause a contraction of the gas in A should take place a corresponding diminution of volume of liquid in C is noticed, which must then be deducted from the measured quantity of liquid in the tube B. By means of the centimeter scale on A, the extra pressure inside can be ascertained. The volume of gas is read off in millimeters, and this corresponds with double the height of the column of liquid, the difference being regarded as extra water pressure, which may be reduced to mercury pressure by dividing by 13.6, and must then be added to the observed

FIG. 38.



A Simple Apparatus for Measuring Gases.

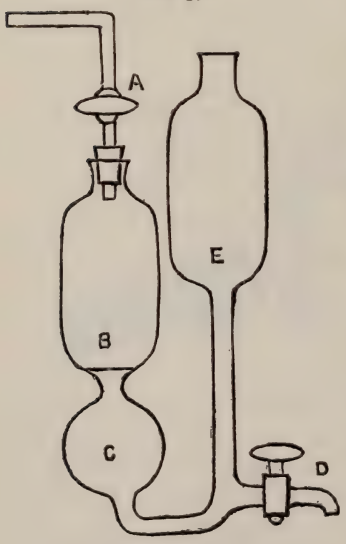
barometric pressure. The volume of gas ascertained by measuring the liquid in B is then, as usual, corrected for temperature and vapor tension, as well as for pressure.—Zeit. f. angw. Chem., 1894, 517.

A Compound Glass.—The new German glass is a new and singular departure in that line, disregarding as it does the ordinary principle that good glass must contain, together with silica and a divalent or trivalent metallic oxide, the oxide of a monovalent metal—an alkali metal or thallium—but while thus free from alkali can be worked before the blowpipe, and has a small co-efficient of expansion. The inventor was led to the production of this compound glass by studying the state of strain in ordinary glass vessels and tubes cooled in contact with air. As a hollow glass vessel,

cooled in contact with the air, has its outer skin in a state of compression, while the inside is in a state of tension, it is easily damaged on the inside, but is resistant on the outside ; a hollow glass vessel, if introduced when cold into warm air, has its outer skin thrown into a state of compression, but if, when it is hot, it is exposed to cold air, its outer skin is thrown into a state of tension—this being the reason why cold air causes glass to crack more readily than hot air does. The inventor succeeded in throwing the outer layer into a permanent state of compression by covering the glass vessel with a thin outer layer of glass which has a small co-efficient of expansion. The flasks made of such glass, can be filled with boiling aniline and immediately sprinkled on the outside with cold water—glass dishes, too, can be heated over the naked Bunsen flame without cracking. Pressure tubes of this compound glass are also made to meet all the requirements of practice, and have been kept in continuous use on locomotives for five months.—Amer. Drug. and Pharm. Rec., 1894.

A New Hydrogen Sulphide Generator.—J. I. D. Hinds.—The accompanying figure shows a hydrogen sulphide generator in which objectionable features are reduced to a minimum, and the greatest convenience secured. At B is a perforated disc of lead, glass or porcelain, which supports the ferrous sulphide. When the stop-cock at A is closed the acid is forced back by the gas into the vessel E. The globe C receives the gas and prevents its bubbling back into E. When the acid is exhausted it is drawn off at D and a new supply added above. The following are the advantages of the apparatus: 1. It is in one piece. 2. The pressure is small when the cock is closed. 3. The quantity of escaping gas is reduced to a minimum. 4. It is conveniently filled and emptied. 5. It is always ready.—Chem. News, 1895, 143.

FIG. 39.

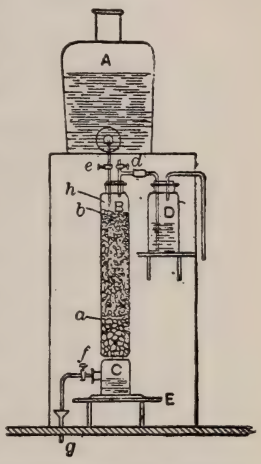


A New Hydrogen Sulphide Generator.

Hydrogen Sulphide Generator.—H. G. Schanche described an apparatus which has proved, during seven years of use, to furnish always an absolutely uniform supply of gas. From the reservoir *A* the acid passes into the generator *B*, which contains ferrous sulphide *a b*, resting on coarse pebbles at *a*. The ferrous chloride formed collects in *C*, whence it may be removed easily from time to time by opening the cocks *d* and *f*, and so allowing the solution to flow through the lead pipe *g*, into a drip pan under the table on which the apparatus stands. The quantity of gas supplied is controlled by

regulating the flow of acid by means of the cock *e*, and the supply is kept uniform by the height of the column of ferrous sulphide. As the acid percolates through this it is completely neutralized. *D* is an ordinary wash bottle, and the shelf *E*, on which the generator stands, is easily slipped off its bracket, so that the generator can be readily removed for cleaning or re-charging.—Pharm. Jour. Trans., 1895, 647; Jour. Am. Chem. Soc., xvi., 868.

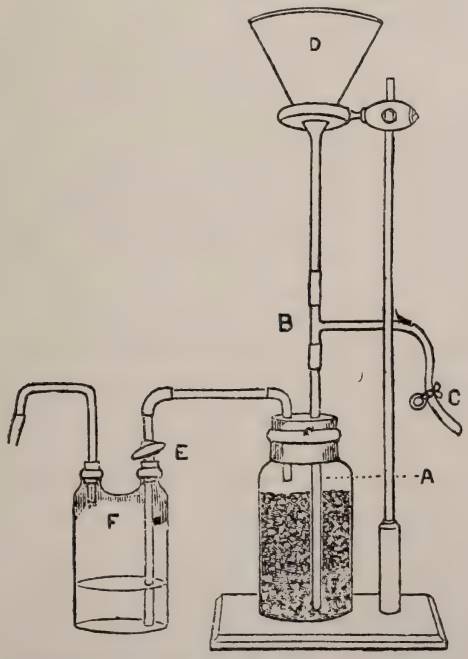
Fig. 40.



Hydrogen Sulphide Generator.

A New Sulphuretted Hydrogen Apparatus.—J. F. Liverseege.—Most of the arrangements used for preparing sulphuretted hydrogen on a small scale suffer from either or both of the following disadvantages: (1) The size of the hole through which the ferrous sulphide is introduced to the generator requires the sulphide to be crushed rather fine, with the result that there is a good deal of powder which gets into the acid bottle and continually generates the gas. (2) The tube between the acid bottle and the generator is small and is frequently stopped up. To avoid these troubles some four years ago the author devised the following ar-

Fig. 41.



A New Sulphuretted Hydrogen Apparatus.

rangement: The generator, *A*, is a pint green glass wide-mouth bottle, with broken glass at the bottom an inch deep, and on it the lumps of sulphide; as the neck is 1¾ inches in diameter, fair-sized pieces can be put in. This is closed gas-tight with a cork or rubber bung coated with paraffin wax; through it pass two glass tubes; one, just through the cork, is connected with a pint Woulff's bottle, *F*, for washing the gas; the other, $\frac{5}{16}$th inch inside diameter, reaches nearly to the bottom of the generator, and is connected by means of a T-piece *B*, with a large glass funnel *D*. The other leg is closed by a rubber tube and pinch cock *C*. A little water is put in the funnel and commercial hydrochloric acid added. As the gas is generated, the liquid is forced up into the funnel, the layer of glass at the bottom preventing the sulphide soaking in the acid. A glass stop-cock, *E*, is used for regulating the supply of gas. When no more gas is required, the pinch-cock, *C*, is removed, and the acid runs out through the side tube into a bottle for future use with more acid if necessary.—Chem. News, 1894, 95.

Artificial Ice.—A. C. Christomanos.—Ice produced from the water supply of Athens was found to be separable into transparent and opaque portions. A detailed analysis showed very plainly that of these two varieties the former only was fit for consumption, being almost pure; the impurities of the original water were divided into various proportions between the opaque ice and the small amount of water that did not freeze.—Ber. d. Chem. Ges., 1894, 3431.

Ice on a Small Scale.—O. Liebreich describes the following apparatus for producing ice on a small scale. The apparatus consists of a double-walled drum with an outside covering of asbestos, which turns on an upright axis by means of a crank.

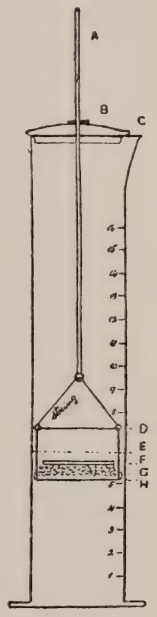
In the opening a tinned can fits which is shaped like a truncated pyramid with a four-cornered base. It is closed by a metal cover with thumbscrews. This inverted pyramid is filled with water at 14° C. [57° F.] and 3 kilos [6.6 pounds] of ammonium nitrate and 3 kilos [3 quarts] of cool water are put in the double lining of the drum.

This is then turned rapidly for fifteen minutes when, the water in the tinned can will be found to be frozen, yielding about 500 Gm. of ice. The ammonium nitrate can be recovered from the solution by evaporation, with a loss, if carefully managed, of about 1.33 per cent. If carefully carried out the process yields ice at a cost of about 40 pfennigs per kilo, says Liebreich, which would be equivalent to about four and a half cents per pound if the price of ammonium nitrate were the same here as in Germany. —Amer. Drug. and Pharm. Rec., 1895, 140.

Infusion Apparatus.—A contributor to Merck's Market Report is the originator of this infusion apparatus. It consists of five parts. The first is a cylindrical measure holding 16 ozs. The second is a wooden cover

with a hole in the centre. The third is a hollow glass cylinder 2 inches deep, fitting into the measure—its lower end covered by a piece of cheese-cloth, which is firmly tied round it; its upper end supported at two points by a string, to which a stick is attached, transversely perforated, at intervals of ½ inch, with small holes, and of such a size that it will slide through the hole in the cover. The fourth part is a circular plate of glass, fitting into the cylinder. The fifth is a wooden pin, fitting into any of the perforations of the stick. In working, if 6 ozs. of infusion are required, pour 6 ozs. of water into the measure; then—*e. g.*, in the case of inf. quassiæ—35 grs. of quassia. The glass plate *F* is used for keeping the quassia-chips under water. The wooden rod is slipped through the hole in the cover; the cover is placed on the measure; and, by means of the rod *D*, the small vessel is arranged in such a way that the water will just cover the drug. Finally, a wooden pin is put through a hole in the rod above the cover, to keep it in position. The rest explains itself. After the apparatus has stood the required length of time, lift the inner part out of the measure, and the clear infusion is ready, no straining or filtering being necessary.—Chem. and Drug., 1895 (Jan. 5), 23.

FIG. 42.



Infusion Apparatus.

Isomorphism.—J. W. Retgers. Elements and simple inorganic compounds crystallize mostly in the regular and hexagonal systems, 85 per cent. of the elements, 88 per cent. of diatomic compounds, and 53 per cent. of triatomic compounds obeying this rule; complex inorganic and organic compounds, on the other hand, form crystals belonging chiefly to the rhombic and monoclinic systems. The author points out that owing to this connection between crystallographic form and chemical simplicity, many compounds are only apparently and not really isomorphous.—Zeit. f. physikal. Chem., 1894, 1.

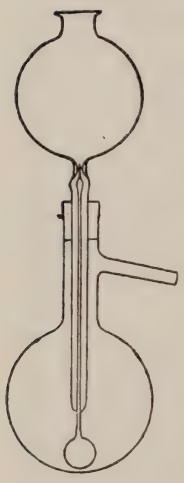
Historical Note on Isomorphism.—J. H. van't Hoff points out, in connection with Retgers' recently published papers on isomorphism, that Buys-Ballot in 1846 drew attention to the fact that the chemical simplicity of a chemical compound was connected with the symmetry of its crystalline form, and adds a table by which this is clearly indicated.—Zeit. f. physikal. Chem., 1894, 548.

Laboratory Apparatus.—F. Anderlini.—In place of the ordinary Geissler potash bulbs used in organic analysis, the author recommends a modification in which three bulbs are arranged one above the other inside a fourth; the whole apparatus stands on a foot, and can be improved by the addition of a tap closing both entrance and exit tubes. An improved form of calcium chloride drying tube, for use in organic analysis, is also described; it

consists of a cylinder standing on a foot, and containing an internal tube down which the products of combustion pass. The whole apparatus is filled with calcium chloride, and both inlet and outlet are closed by a tap at the top of the apparatus. Towers of somewhat similar construction to the preceding may be advantageously employed in drying the air or oxygen used in the analysis. The author also described improved forms of fractionating columns and a safety separating funnel.—Gazetta, 1894, 150; Jour. Chem. Soc., 1894, 329.

Constant Level Apparatus.—J. C. Chorley designs an apparatus for maintaining a constant level of liquid in a distillation flask. The small bulb at the lower extremity of the long thin tube inside the flask floats on the surface of the liquid. The upper end of the same tube is ground to fit into the thickened part of the larger tube surrounding it, and prevents the water in the large bulb on top from flowing into the flask, except when the level of the liquid falls in the latter.—Analyst, xx., 16; Pharm. Jour. Trans., 1895, 694.

FIG. 43.



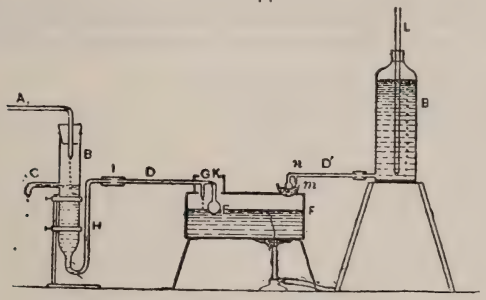
Constant Level Apparatus.

A Constant Level Apparatus.—F. C. Robinson. B is a glass tube about 2.5 Cm. diameter, into which is passed the small tube *A* through a cork. A side tube *C* extends out about 10 Cm., and is of much larger bore than *A*. Upon the lower end of *B* is sealed a small glass tube, *H*, which is bent up until opposite *C*, and then turned at right angles. Connected with *H* by a rubber tube is a tube, *D*, of equal bore and about 25 Cm. long. Upon the other end of *D* is a bulb, *E*, 5 Cm. in diameter, turned down at right angles, as shown in the cut. At the point *G* is a short tube, and just by it at *K* the tube *D* is closed up by melting it together. *F* is a water-bath, through one of the openings of which *E* passes and floats upon the water. As the water rises in the bath, *E* of course floats higher and raises the tube *D*. The rubber connector holds *D* upright and allows it to move. If *B* is clamped so that *C* and *D* are upon a level, and the tap opened so that water flows into *B* through *A*, it will run out of both *C* and *D*, but of course *D* will soon float up so high that no water will run through it, and all will discharge at *C*. Now heat the bath, and as soon as evaporation has lowered *D* sufficiently, more water will run into the bath to take the place of that evaporated. A small stream of water flows constantly out of *C* and into the sink, but it need be very small indeed.

If the bulb *E* enters the bath through a place needed for evaporations, a small copper cylinder slightly larger than the opening, and having a narrow strip cut out of it for *D* to move up and down in, may be placed over it as in the cut. Of course the float may be placed in a side tube soldered to the bath with water connection to it. If one cannot make it of glass, it

could easily be constructed of metal by any tin-man. The author finds also that the same idea works admirably for constant feeding of a small platinum dish in evaporating large quantities of water or other liquids for analysis of residues. In such cases the tube D' is directly connected with a bottle holding several litres of water in the manner illustrated in the cut at the right. As D' falls through evaporation of the water in m, air enters through L and water drops out at n till D' rises, so that n is higher than

FIG. 44.



Constant Level Apparatus.

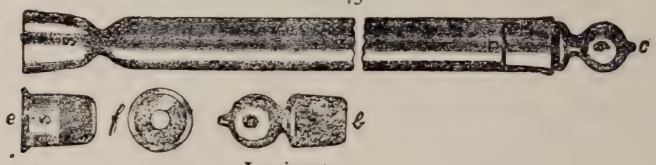
the bottom of L when it stops, and thus the level in m is constant. In this case the tube D' is very small, so that the bulb can be very small and still hold it up. In the one used, the bulb is only 1.5 Cm. in diameter, and the tube n so close to it that it can be used in a crucible. It is very easy to clean the float from the slight residue clinging to it at the end. The same apparatus is used for washing precipitates with a large amount of water, placing the bulb in the funnel on the surface of the wash-water. —Jour. Amer. Chem. Soc.; Pharm. Jour. Trans., 1894, 254.

Preventing of Bumping in Liquids.—V. Gernhardt improves upon Beckmann's apparatus by replacing the platinum with enamel alone. The author noticed that while using the improved Beckmann apparatus when the platinum wire is sealed by means of the new Jena enamel, the boiling took place not from the platinum rod itself, but from the red enamel. Beckmann originally introduced a piece of platinum wire into the bottom of the flasks, the function of the platinum being to promote a steady ebullition in the liquid by disturbing the chemical equilibrium at one point by partial superheating, and thus preventing superheating throughout the whole mass.—Ber. d. Chem. Ges., 1894, 964.

Lysimeter for Determining Solubilities.—Chas. Rice finds the lysimeter (lysis, solution) very serviceable in determining the solubility of substances at high temperature, when the solvent is highly volatile. The idea upon which it is based is the separation from the original solution, which usually contains an excess of the substance in suspension, of a filtered portion at the same temperature as that of the former. The glass tube a is 15 Cm. long and 10 Cm. in external diameter, and is provided at

one end with a well ground stopper, *c*, while the other end is cup-shaped and connected with the main tube by a contracted neck. A carefully ground glass bell, *e*, having a perforation, *f*, at the bottom, is made to fit this cup, as is also the stopper *b*. Assuming that the solubility of morphine in boiling alcohol is to be determined, enough liquid must be provided to allow of at least one-half the tube *a* being immersed. The

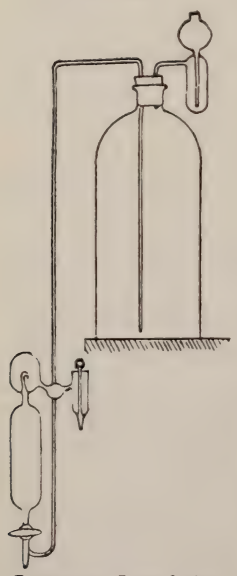
FIG. 45.



Lysimeter.

stopper *c* and glass bell *e*, the latter filled with absorbent cotton and fastened in with thin platinum wire, having been placed in position in the tared tube, alcohol is boiled in a beaker or test-tube and saturated with morphine, after which the prepared tube is immersed. When the apparatus has acquired the temperature of the boiling liquid, the stopper *c* is removed, whereupon the liquid filters upward through the cotton. To secure uniformity in the liquid, the filtered portion should be allowed to flow back once or as many times as may seem necessary. The stopper *c* is then re-inserted, the tube withdrawn and inverted, and the glass bell removed and replaced by the stopper *b*. After cleaning the tube with alcohol it is allowed to cool, and the weight of the contained solution then determined. On transferring the contents to a tared beaker or capsule and evaporating, the weight of the dissolved morphine will be found.—Pharm. Jour. Trans., 1895, 647; Jour. Am. Chem. Soc., xvi., 715.

FIG. 46.



Constant Level Apparatus.

Apparatus for Preserving and Delivering Standard Solutions.—J. C. Charley. This apparatus will be found useful for preserving and delivering known volumes of such solutions as alcoholic potash, which are liable to contamination by exposure to air. The wash bottle inserted in the large store bottle is filled with a solution of caustic potash, and so also are the bulbs connected with the top of the pipette. By means of the two-way cock this can be filled to overflowing, and a known quantity of the solution can be delivered by running off to a mark on the narrow part of the pipette.—Pharm. Era, 1895, 141; Amer. Drug. and Pharm. Rec., 1895, 176.

Symbol for Denoting the Optical Activity of Compounds.—H. Landolt. Ladenburg has recently stated that the rotatory power of d-coniine is $[a]_D = 15.6$, and he draws attention to the fact that Landolt gives the value 17.9 on the authority of Schiff. Landolt, in reply, states that he, having observed that the natural base had a rotatory power of 15.6° in a 1 decimeter tube, concluded that Schiff's value was merely the observed angle, and accordingly divided this number by the specific gravity, using the value observed by Schiff, namely, 0.873 at 15°. He thus obtained 17.9 as the specific rotatory power. Schiff is unable to say definitely, but he believes that the value given by him (15.6) had already been divided by the specific gravity. It is, however, to be observed that Schiff's value for the specific gravity of the base, as to the accuracy of which he is certain, differs from that of Ladenburg. It is suggested that, to prevent confusion, authors shall employ the words "observed angle" and "specific rotatory power," the latter being taken in Biot's sense and denoted by the symbol [a], a small letter being affixed to indicate the particular light employed. —Ber. d. Chem. Ges., 1894, 1362.

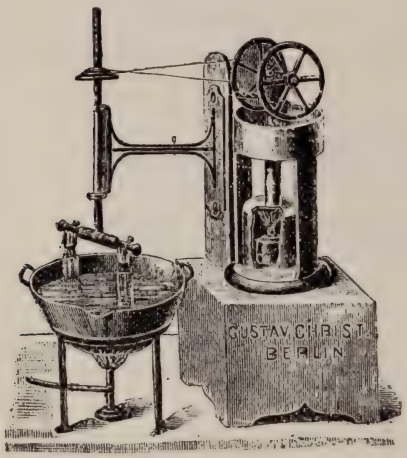
Optical Activity of Organic Liquids.—P. Frankland and J. MacGregor show that as a result of their experiments, as well as those of others, the effect of temperature on optical activity will have to be more taken into consideration in the future, and when systematically studied for a large number of active substances, it may assist in throwing light on the internal arrangement of the molecule of active compounds.—Jour. Chem. Soc., 1894, 760.

The Nascent State.—J. C. Gregory calls attention to the somewhat sweeping denunciation by L. Andrews, of the theory of nascent action. The author believes that while Andrews has not succeeded in disproving nascent action, in instances which he cites, still he has put forth a few fallacies which require us to revise our views on these points, and we may find nascent action to be less widely extended than we have heretofore believed.—Chem. News, 1894, 188.

On the Distinction between Mixtures and Compounds.—P. J. Hartog. The text-books attempt to distinguish between compounds and mixtures by stating that "the same compound always contains the same elements united in the same proportions," and imply that this is not true of the same homogeneous mixtures. But the statement interpreted literally is a truism, and not a law, and applies equally to both mixtures and compounds. Moreover, the statement has nothing to do with the Berthollet-Proust controversy, although it is supposed to sum up Proust's views on the matter. The theoretical distinction between compounds and mixtures was briefly discussed, and it was pointed out that the best experimental criterion for the purity of a chemical compound was afforded by the researches of Raoult, who has shown that any mixture invariably lowers its freezing point and raises its boiling point.—Chem. News, 1894, 90.

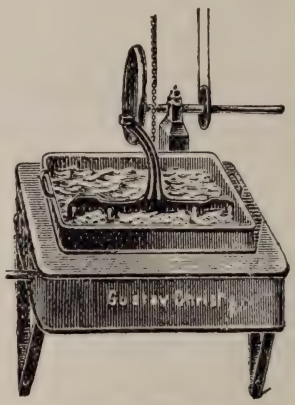
Small Motor in Chemical and Pharmaceutical Laboratories.—Gustave Christ describes a variety of apparatus in the operation of which the small

FIG. 47.



Hot Air Motor with Stirrer.

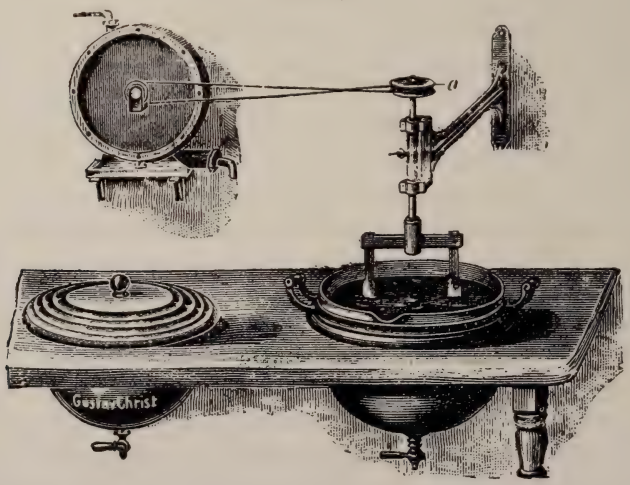
FIG. 48.



"Rake" Stirrer.

motor serves a useful purpose. The motors most used for this purpose are the turbine water motor and that run by hot air. The former is only available, however, where there is a good water pressure, which somewhat limits its field of usefulness. The hot-air machine is driven by the expansion and

FIG. 49.



Turbine Motor Operating Stirrer in Evaporating Kettle.

contraction of air by the alternate heating and cooling of a cylinder containing air. The power furnished by this machine is not sufficient to stir

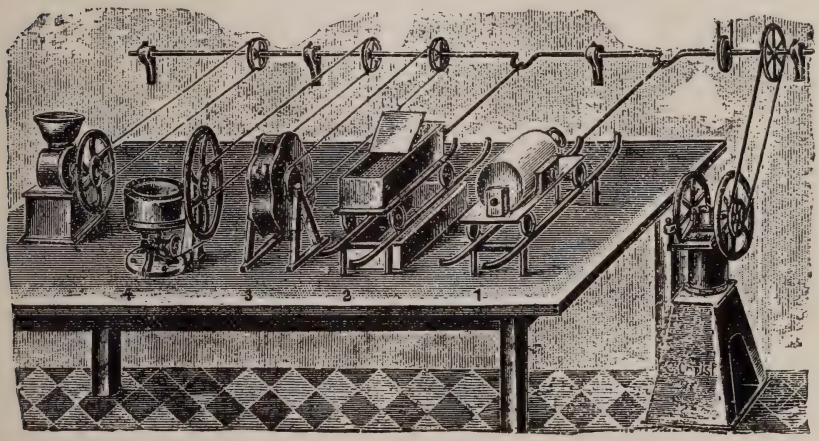
a very heavy or viscid liquid. It is termed No. 1 by Christ. The cylinder has a diameter of 30 Mm.

The largest size has a cylinder with a diameter of 150 Mm. furnishing about $\frac{1}{3}$ horse-power. This engine is shown in Fig. 50, where it is operating: 1, a large bottle agitator; 2, a sieve shaker; 3, a ball mill; 4, a centrifuge; 5, a mill, and 6, a ventilator. This size may be heated either by gas or by oil, and requires a flow of water for cooling the cylinder.

These motors can also be used to advantage in electrolysis by attaching to a small dynamo, and either using the current direct or from a storage battery which can be charged at convenience.

Fig. 49 shows a small but efficient turbine used for the motive power of

FIG. 50.



Hot Air Motor Operating Various Apparatus.

a stirrer. This form of motor is frequently used as subsidiary to steam or electricity.

Fig. 48 shows a stirrer operated on the "rake" pattern, which can, of course, be operated by the above or any other convenient form of motive power. This form of stirrer, with a horizontal movement, is used in washing cotton in the process of manufacturing absorbent cotton by several manufacturers in this country.—Amer. Drug. and Pharm. Rec., 1895, 41; from Pharm. Zeit., 1894.

Repercolation as a B. P. Process.—F. C. J. Bird considers that the time has now arrived when the question of the adoption of the process of repercolation should receive careful consideration, as it may be applied to at least two of the formulas of the B. P., viz.: Extractum Cocæ Liquidum and Podophylli Resina.

The details of the process which the author has found to work well in practice are: Six percolators are a convenient number to use, although it is

quite possible to work with four. The powdered drug is divided into as many equal parts as there are percolators, and supposing 6 lbs. to be the quantity operated on, 1 lb. is uniformly moistened with 16 fluid ounces of proof spirit and passed through a moderately coarse sieve. The orifice of the percolator having been plugged with cotton-wool, and a layer of clean silver-sand placed upon it, the moistened drug is introduced, and a sufficiency of proof spirit poured on to saturate the marc and leave a stratum of liquid above it. The whole having been allowed to macerate during twelve hours, percolation is allowed to proceed slowly. The first 16 fluid ounces of percolate are collected separately and used to moisten the second pound of coca leaves. This operation is repeated for each percolator, until the first 16 ozs. of percolate attains a specific gravity somewhat higher than that of the finished product. For coca this would be about 1.010, and is generally reached when the extract has passed through about the third or fourth percolator. This percolate is set aside, the second 16 fluid ounces being used to moisten the drug for the next percolator, and the same procedure is followed for the remaining percolators. From the last one sufficient percolate is collected to make, with the percolates already reserved, 92 fluid ounces in all, and afterwards as many fractions of 16 ozs. each as may be necessary to completely exhaust the drug. An allowance of 4 fluid ounces is made in the product to compensate for the extract in the weak percolates collected for a subsequent operation. When starting with weak percolates in hand, the strongest is used to moisten the contents of the first percolator, and the others poured on in succession; in this case the full quantity of product is obtained.—Pharm. Jour. Trans., 1894, 159.

Repercolation in Official Pharmacy.—R. A. Cripps deduces two types of manipulations. The first is applicable in the preparation of extracts of cimicifuga, coca, hamamelis, hydrastis, jaborandi, nux vomica, rhamnus frangula, taraxacum and viburnum, etc. The process is: divide 4 lbs. of the drug into 4 equal parts, dampen the first portion with 10 fl. ozs. of the diluted spirit, macerate 6 hours, pack in a percolator, add sufficient menstruum to saturate the drug and leave a layer above. When the liquid begins to drop, close the orifice and macerate for 24 hours. Then allow percolation to proceed. Collect the percolate in fractions of 10 fl. ozs. and with the first dampen a second portion of drug. Then pack, macerate and percolate as formerly, but save the first 8 fl. ozs. using the next 10 fl. ozs. to dampen a third portion. Treat this like the second portion, but reserve 16 fl. ozs. and add to the 8 ozs. previously reserved. Dampen the fourth portion of drug with the next 10 fl. ozs. of drug and carry on the percolation as before until 40 fl. ozs. have been obtained from the last percolator, which is added to the reserved portion. The alcohol in the drug is recovered by replacement with water or pressure.

In Type II. the process is the same as that given above, excepting that

no percolate is reserved from the second and third percolators, but the whole of the menstruum is carried through the whole series of percolators. The following extracts are made in this manner: Belladonna, cinchona, filix mas, gelsemium, glycyrrhiza, physostigma, quassia, etc.—Pharm. Jour. Trans., 1895, 1169.

Home-Made Graduated Percolating Bottle.—At the last meeting of the Oregon Pharmaceutical Association J. Preuss told how pharmacists can construct engraved measuring bottles themselves. Select an even bottomed, ground-stoppered acid bottle; smear the sides evenly an inch in width with a mixture of white wax and a small quantity of turpentine previously melted together. Balance the bottle on the scales. Now take distilled water at 60° F., and begin graduating by using 100 C.c. from a 100 C.c. flask as the unit, at the same time checking the liquid measure by the 100 Gm. weight on the scale. By observing this no discrepancy can creep in. After the liquid has come to rest, mark with a scissors point the line of the lower meniscus at both edges of the wax. Continue adding 100 C.c. quantities, checking with the weights and marking, until the desired height is reached. Empty the bottle, draw the lines across the wax from the points, and mark the figures into the wax by using the scissors point again. Brush the wax off clean; by means of a camel's hair pencil brush the etching fluid into the sunken numbers. After ten minutes the numbers will be marked into the glass; but better let stand over night, as a faint line will then be marked quite distinct. Scrape and wash off the wax, and you will have a $1 percolating jar.—West. Drug., 1895, 238.

Clogging of Percolators.—An anonymous writer in the Spatula, speaks about the clogging of percolators, and a device which he has made for over-

FIG. 51.

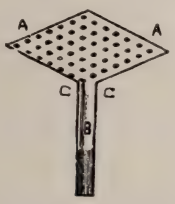


FIG. 1.

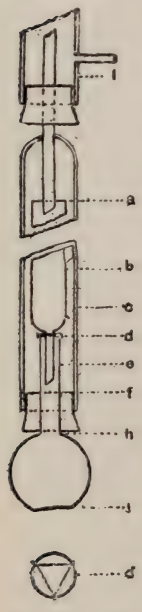
FIG. 2

coming the difficulty. In his experiments he had the device (Fig. 1) made of tin. The top, marked *A A*, is made of strainer-tin, and the tube *B* is made of sheet tin. It is used as follows: A percolator of the size desired is taken, and a cork of suitable size fitted snugly down into the neck. Through the centre of the cork a hole is bored, in which the tube of the plug fits tightly and passes clear through the cork. The plug is then covered with cheesecloth tied over the top of *C C*. The tube is then pushed firmly into the hole in cork, and the cork fitted to its place in the percolator. This fur-

nishes a perfect diaphragm. It will be found *par excellence* in making syrups by cold percolation. It is one of the most convenient devices the writer has ever tried, being easily cleaned and inexpensive. Fig. 2 shows the plug in place, By attaching a rubber tube to the end of the tube the flow can be easily regulated.—Chem. and Drug., 1895 (Jan. 5), p. 23.

A Modification of Knorr's Apparatus is suggested by Omar Carr, to obviate several inconveniences associated with the ordinary form. To the inverted percolator dome *c*, is adapted a tube *a b*, of convenient size, the shoulder of which is supported by the small triangle *d d*, arranged upon the rounded top of the flask neck. The flask, of 100 C.c. capacity and without a rim at the mouth, should project above the cork *f* about two inches. To bring extract solutions to definite volume, the apparatus should be sunk in a water bath to a sufficient depth to prevent the solvent accumulating upon the cork *f*. It is readily adapted to the condenser of the Knorr extractor, as shown at *l*, and upon completion of the extraction the cork *f* is easily removed, and the flask wiped and dried, without danger or annoyance being caused by mercury globules.—Jour. Am. Chem. Soc., xvi., 868.

FIG. 52.



Knorr's Apparatus.

Blocks for Drying Precipitates.—Austen and Broadhurst found moist precipitates to dry readily on absorbent blocks, artificially made by thoroughly mixing equal parts of infusorial earth and plaster of Paris, moistening the mixture with sufficient water to work easily, and placing in moulds. These are made by taking a large sheet of glass, greasing the surface with light lubricating oil, and laying on edge on the sheet long glass strips an inch wide and a quarter of an inch thick. The distance apart of the strips should be six inches or more, and cross pieces cut from similar strips will then complete the squares. All the strips should be slightly oiled, and when the wet mixture is poured in the top should be smoothed with a straight edge of wood. When set the blocks are removed and heated for a day or two in an air chamber at 100° to 120°, to free them from hygroscopic moisture. In use the filtering paper containing the wet precipitate is placed on the smooth side of the block.—Jour. Amer. Chem. Soc., 1895, 472.

Calibration of Pipettes.—J. F. Liverseege describes the precautions to be taken before calibrating pipettes. It is noted that since the grain measure of the British Pharmacopœia is required to be the volume of one grain of water at 15.5° C., and the fluid ounce is the volume of 437.5 grains of water at 16.66° C., the latter will measure 437.57 grain measures. The errors in some British pipettes were stated in tabular form, as well as the

mean results of the examination of a series of metric pipettes, and a method of approximate correction was described.—Pharm. Jour. Trans., 1894, 245.

Automatic Pipette.—Emil Greiner devises a pipette for use when it is required to take a great number of samples of a given liquid in succession, and all of the same volume. The construction of the pipette, which automatically takes up the exact volume of liquid required, is sufficiently evident from the illustration, and it has been found practicable to make it in all sizes required up to 50 C.c. The necessity of drawing up the liquid by the mouth and watching the mark is entirely obviated, and the instrument would appear to be peculiarly adapted for use in cases where pipettes are used often and accuracy is desired.—Pharm. Jour. Trans., 1895, 647; Jour. Amer. Chem. Soc., xvi., 643.

Fig. 53.

Automatic Pipette.

Apparatus for Regulating Diminished Pressures.—F. Krafft.—The regulator for diminished pressures, described by the author twelve years ago, consists of a large vessel with two taps, not of the large vessel alone, as Kahlbaum states.—Ber. d. Chem. Ges., 1894, 1823.

A Refractometer with a Trough capable of being Heated—Application to the Measurement of Fatty Substances.—M. Féry.—This paper cannot be intelligibly reproduced without the accompanying illustrations.—Compt. rend., vol. cxix., No. 5.

The Relation of Saccharimeter Degrees to Angular Degrees.—E. Rimbach.—One scale division on the Ventzke quartz wedge saccharimeter is usually taken as equal to 0.3455° or 0.3465° o rotation for sodium light. The author has redetermined this ratio, and finds that it increases slightly as the concentration of the sugar solution increases; he uses, as the source of light, either an ordinary gaslight or an Auer lamp with a dichromate screen. For cane sugar and glucose the mean value of the ratio is 0.344; the ratio is practically the same for solutions of santonin in chloroform and of camphor in alcohol.—Ber. d. Chem. Ges., 1894, 2282.

Solubility of Inorganic Salts in Organic Solvents.—S. V. Laszczynski gives tables of the solubilities of copper chloride, mercuric chloride, mercuric iodide, cobalt chloride, stannous chloride, lithium chloride, lead iodide, potassium iodide, silver iodide, silver nitrate, bismuth nitrate and potassium thiocyanate in ethylic ether, ethyl acetate, acetone, amylic alcohol, benzene, aniline and pyridine.—Ber. d. Chem. Ges., 1894, 2285.

Melting Points of Inorganic Salts.—V. Meyer, W. Riddle and Th. Lamb (Pharm. Centralh., xxxv., 715) have determined, by the aid of specially-constructed platinum apparatus, the melting-points of a series of inorganic salts. The results are as follows:

Caesium iodide	621° C.
Rubidium iodide	641.5° C.
Sodium iodide	661.4° C.
Potassium iodide	684.7° C.
Potassium bromide	722° C.
Sodium bromide	757.7° C.
Potassium chloride	800° C.
Calcium chloride	806.4° C.
Sodium chloride	815.4° C.
Strontium chloride	832° C.
Sodium carbonate	849.2° C.
Sodium sulphate	863.2° C.
Potassium carbonate	878.6° C.
Barium chloride	921.8° C.
Potassium sulphate	1,078° C.

Mutual Solubility of Salts.—H. Le Chatelier.—In the determination of the solubility of salts one in another, or what amounts to the same thing, of the fusing points of saline mixtures, three general cases may be distinguished. 1. The salts solidify to form isomorphous mixtures of variable composition. 2. Each salt solidifies separately from the mixture. 3. The two salts combine and solidify as a compound of definite composition. Cases of the first kind have already been considered by the author and also by Küster, and in the present paper instances of the second kind are recorded. The solubilities of sodium chloride and of lithium sulphate in various salts were measured by determining the fusing points of the saline mixtures.—Compt. rend., 1894, 709.

Volume of Salts in Solution.—L. de Boisbaudran refers to Charpy's confirmation of the generality of the rule that when aqueous solutions of salts are diluted with water, there is a diminution of the total volume. This is held to prove that the volume occupied by a given weight of a salt is greater in proportion as the solution is more concentrated, assuming that the volume of water is constant. With the exception of certain ammoniacal compounds, all mineral salts show evidence of contraction on solution in water. Thus, Charpy states that ammonium chloride and some other salts of the same base are the only bodies of which the solution is accompanied by an increase in the total volume. Sodium acetate seems to Boisbaudran to form a connecting link in this respect between ammonium chloride and the generality of mineral salts. All the salts he has examined also—except sodium sulphate, $Na_2SO_4.10Aq$.—show, at the ordinary temperature, a contraction of volume on crystallization from supersaturated solutions—sodium acetate, hyposulphite, monosulphide and carbonate; magnesium sulphate, alums, ammonium nitrate and silver nitrate. In the case of sodium sulphate, it is difficult to prepare extremely supersaturated solutions, and a slight expansion was always observed on crystallization.—Comp. rend., CXX., 539.

A New Shaking and Stirring Apparatus.—E. Sauer.—This is driven by a hot-air engine, and will shake a 6-litre bottle, or a frame-work containing 4 to 8 bottles of 500 C.c. capacity, and, at the same time, will drive 6 to 10 Witt's stirrers, a centrifugal machine, a mill, etc.—Ber. d. Chem. Ges., 1895, 559.

Saturated Solutions.—R. Löwenherz.—The paper contains researches of the saturated solutions containing potassium and magnesium chlorides and sulphates in all their possible combinations.—Zeit. f. physikal. Chem., 1894, 459.

Saturated Solutions.—A. Etard.—Determinations of the solubility of salts between 100° and 250° are conveniently made in a glass tube bent at 120° and constricted at the middle. The salt is placed in one arm, and the tube partly filled with water and sealed off; after heating at a fixed temperature, in a bath containing a molten mixture of potassium and sodium nitrates, part of the solution is caused to run into the second arm of the bent tube, and is analyzed when cold. Solubilities at temperatures above 250° are best determined by Guthrie's method. The solubility, y, of a salt is taken by the author as the percentage of salt contained in the saturated solution; if p be the weight of salt, and $p + \pi$, the weight of solution in which it is contained, then $y = \frac{100\ p.}{p + \pi}$. Using this scale of solubilities in place of the ordinary one, the curve connecting solubility and temperature lies wholly between 0 and 100 per cent. of salt; further, 100 on the y-axis corresponds with the melting point of the anhydrous salt on the other axis; the curve is also a curve of melting points of mixtures of dissolved substance and solvent.—Ann. Chim. phys., 1894, 503; Jour. Chem. Soc., 1894, 448.

Density of Dilute Aqueous Solutions.—F. Kohlrausch and W. Hallwachs. —In order to determine the densities of dilute aqueous solutions to within a limit of error of 10^{-6}, the authors have had recourse to the displacement method of weighing a ball of glass in the liquid under examination. The ball is suspended from an arm of the balance by means of a single cocoon fibre; its total weight was 133 Gm. but when weighed in the solutions under examination its weight never exceeded 4 Gm. In this way solutions of densities up to 1.03 could be examined. Great care was taken in measuring the temperature and in maintaining it constant during the carrying out of a determination, a greater variation than $\frac{1}{100}°$ being in no case allowed. A precise description of the apparatus employed for this purpose and its mode of arrangement is given in the paper.—Anmer. f. Phys. Chem., 1894, 14.

Percentage Solutions.—E. U. Wright (Merck's Mark. Report, 1894, 258), has prepared a table of parts and percentage-equivalents based on the apothecaries' weight. An accurate working-table of parts and percentage-

equivalents, for guidance in making solutions, etc., is undoubtedly of decided advantage to the busy pharmacist in his prescription-laboratory, and a useful aid to his apprentices. A mistake in mental arithmetic is possible with any one, no matter how conversant he may be with weights, measures, and the calculation of percentages based on weights or measures; and at the dispensing-desk, where accuracy and rapidity are essential, a moment saved is often of utmost importance.

A table embodying the foregoing requirements, based on the apothecaries' weight, is herewith presented. The percentages are graded from $\frac{1}{10}$ of 1 per cent. to 50 per cent.—or their equivalents in parts, from 1 in 1,000 to 1 in 2; and the quantities from 20 minims to 32 fluid ounces.

Regardless of the quantity of solution, etc., to be made, the salt or solid must displace its own weight of solvent;—for instance, a fluid ounce of a 1 in 30 (or 3⅓ per cent.) solution of cocaine, must contain 16 grains of the salt, and a sufficient quantity of solvent to make 1 fluid ounce of finished product.

The table will also be found of service in the case of solutions of powerful alkaloids and salts, in determining at a glance the exact quantity of the medicament in each prescribed dose of the mixture. For example:—take a prescription calling for 6 fluid ounces of a 1 in 1,000 solution of iodine trichloride—to be administered in doses of 1 fluidram. By referring to the table, it will be seen not only that 3 grains of iodine trichloride are required to fill the recipe, but also that each dose of the latter—1 fluid dram—contains $\frac{3}{50}$ grain of the medicament.

PARTS.	per cent.	20 min.	fl. ʒi.	fl. ʒij.	fl. ʒiij.	fl. ʒiv.	fl. ʒv.	fl. ʒvj.	fl. ʒvij.	fl. ℥j.	fl. ℥ij.	fl. ℥iij.	fl. ℥iv.	fl. ℥v.	fl. ℥vj.	fl. ℥viij.	fl. ℥xij.	fl. ℥xvj.	fl. ℥xxxij.
1 in 1000	$\frac{1}{10}$	$\frac{1}{50}$	$\frac{3}{50}$	$\frac{3}{25}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{10}$	$\frac{6}{25}$	$\frac{3}{7}$	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{2}{5}$	3	$3\frac{7}{8}$	$5\frac{3}{4}$	$7\frac{3}{4}$	$15\frac{1}{3}$
1 in 900	$\frac{1}{9}$	$\frac{1}{45}$	$\frac{1}{15}$	$\frac{1}{7}$	$\frac{1}{8}$	$\frac{4}{15}$	$\frac{1}{3}$	$\frac{3}{8}$	$\frac{7}{15}$	$\frac{8}{15}$	$1\frac{1}{8}$	$1\frac{3}{8}$	$2\frac{2}{15}$	$2\frac{2}{3}$	$3\frac{1}{8}$	$4\frac{1}{4}$	$6\frac{2}{8}$	$8\frac{1}{2}$	17
1 in 800	$\frac{1}{8}$	$\frac{1}{40}$	$\frac{3}{40}$	$\frac{3}{20}$	$\frac{3}{13}$	$\frac{3}{10}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{7}{13}$	$\frac{3}{5}$	$1\frac{1}{5}$	$1\frac{5}{8}$	$2\frac{2}{8}$	3	$3\frac{3}{8}$	$4\frac{4}{8}$	$7\frac{1}{8}$	$9\frac{2}{8}$	$19\frac{1}{8}$
1 in 700	$\frac{1}{7}$	$\frac{1}{35}$	$\frac{3}{35}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{3}{7}$	$\frac{1}{2}$	$\frac{3}{5}$	$\frac{3}{4}$	$1\frac{3}{5}$	$2\frac{1}{8}$	$2\frac{2}{3}$	$3\frac{3}{7}$	$4\frac{1}{9}$	$5\frac{3}{8}$	$8\frac{1}{4}$	11	$21\frac{9}{7}$
1 in 600	$\frac{1}{6}$	$\frac{1}{30}$	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{3}{10}$	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{3}{5}$	$\frac{7}{10}$	$\frac{4}{5}$	$1\frac{3}{5}$	$2\frac{2}{8}$	$3\frac{1}{5}$	4	$4\frac{4}{5}$	$6\frac{1}{5}$	$9\frac{3}{5}$	$12\frac{4}{5}$	$25\frac{3}{5}$
1 in 500	$\frac{1}{5}$	$\frac{1}{25}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{3}{5}$	$\frac{3}{4}$	$\frac{7}{8}$	1	2	$2\frac{2}{5}$	$3\frac{1}{8}$	$4\frac{4}{5}$	$5\frac{3}{4}$	$7\frac{3}{4}$	$11\frac{1}{7}$	$15\frac{3}{8}$	$30\frac{3}{4}$
1 in 400	$\frac{1}{4}$	$\frac{1}{20}$	$\frac{1}{8}$	$\frac{1}{3}$	$\frac{9}{20}$	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{9}{10}$	$1\frac{1}{20}$	$1\frac{1}{8}$	$2\frac{2}{5}$	$3\frac{3}{8}$	$4\frac{4}{8}$	6	$7\frac{1}{5}$	$9\frac{3}{8}$	$14\frac{2}{8}$	$19\frac{1}{8}$	$38\frac{2}{8}$
1 in 300	$\frac{1}{3}$	$\frac{1}{15}$	$\frac{1}{5}$	$\frac{2}{5}$	$\frac{3}{8}$	$\frac{4}{5}$	1	$1\frac{1}{5}$	$1\frac{2}{5}$	$1\frac{3}{5}$	$3\frac{1}{5}$	$4\frac{4}{8}$	$6\frac{1}{5}$	8	$9\frac{3}{5}$	$12\frac{4}{5}$	$19\frac{1}{5}$	$25\frac{3}{5}$	$51\frac{1}{5}$
1 in 200	$\frac{1}{2}$	$\frac{1}{10}$	$\frac{3}{10}$	$\frac{3}{5}$	$\frac{9}{10}$	$1\frac{1}{5}$	$1\frac{1}{2}$	$1\frac{4}{5}$	$2\frac{1}{10}$	$2\frac{2}{5}$	$4\frac{4}{5}$	$7\frac{1}{5}$	$9\frac{3}{5}$	12	$14\frac{2}{5}$	$19\frac{1}{5}$	$28\frac{4}{5}$	$38\frac{2}{5}$	$76\frac{4}{5}$
1 in 100	1	$\frac{1}{5}$	$\frac{3}{5}$	$1\frac{1}{5}$	$1\frac{4}{5}$	$2\frac{2}{5}$	3	$3\frac{3}{5}$	$4\frac{1}{5}$	$4\frac{4}{5}$	$9\frac{3}{5}$	$14\frac{2}{5}$	$19\frac{1}{5}$	24	$28\frac{4}{5}$	$38\frac{2}{5}$	$57\frac{3}{5}$	$76\frac{4}{5}$	$153\frac{3}{5}$
1 in 50	2	$\frac{2}{5}$	$1\frac{1}{5}$	$2\frac{2}{5}$	$3\frac{3}{5}$	$4\frac{4}{5}$	6	$7\frac{1}{5}$	$8\frac{2}{5}$	$9\frac{3}{5}$	$19\frac{1}{5}$	$28\frac{4}{5}$	$38\frac{2}{5}$	48	$57\frac{3}{5}$	$76\frac{4}{5}$	$115\frac{3}{5}$	$153\frac{3}{5}$	$307\frac{1}{5}$
1 in 40	$2\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{2}$	3	$4\frac{1}{2}$	6	$7\frac{1}{2}$	9	$10\frac{1}{2}$	12	24	36	48	60	72	96	144	192	384
1 in $33\frac{1}{3}$	3	$\frac{3}{5}$	$1\frac{3}{4}$	$3\frac{7}{11}$	$5\frac{1}{2}$	$7\frac{1}{4}$	3	11	$12\frac{2}{3}$	$14\frac{1}{2}$	29	$43\frac{2}{3}$	$58\frac{1}{8}$	72	$87\frac{1}{4}$	$116\frac{1}{3}$	$174\frac{1}{2}$	$232\frac{2}{3}$	$465\frac{1}{2}$
1 in 30	$3\frac{1}{3}$	$\frac{2}{3}$	2	4	6	8	10	12	14	16	32	48	64	80	96	128	192	256	512
1 in 25	4	$\frac{4}{5}$	$2\frac{2}{5}$	$4\frac{4}{5}$	$7\frac{1}{5}$	$9\frac{3}{5}$	12	$14\frac{2}{5}$	$16\frac{4}{5}$	$19\frac{1}{5}$	$38\frac{2}{5}$	$57\frac{3}{5}$	$76\frac{4}{5}$	96	$115\frac{1}{5}$	$153\frac{3}{5}$	$230\frac{2}{5}$	$307\frac{1}{5}$	$614\frac{2}{5}$
1 in 20	5	1	3	6	9	12	15	18	21	24	48	72	96	120	144	192	288	384	768
1 in 10	10	2	6	12	18	24	30	36	42	48	96	144	192	240	288	384	576	768	1536
1 in 5	20	4	12	24	36	48	60	72	84	96	192	288	384	480	576	768	1152	1536	3072
1 in 4	25	5	15	30	45	60	75	90	105	120	240	360	480	600	720	960	1440	1920	3840
1 in 3	$33\frac{1}{3}$	$6\frac{2}{3}$	20	40	60	80	100	120	140	160	320	480	640	800	960	1280	1920	2560	5120
1 in 2	50	10	30	60	90	120	150	180	210	240	480	720	960	1200	1440	1920	2880	3840	7680

RULE.—To find the number of grains (Apothecaries' weight) required to make a solution of any given percentage, first find the quantity of solution to be made, as given on the top line of table, then by referring to the percentage column, find the percentage desired. Draw lines at right angles on the table from the quantity and percentage figures selected, and the answer will be found where the lines intersect.

Densities of Solutions of Soda and Potash.—S. U. Pickering.—The only existing data as to the densities of these solutions are very inaccurate and antiquated. In the present series, the mean experimental error is 0.0000063. The results with soda, which extend from 50 per cent. downwards and apply to a temperature of 15°, when plotted form a figure which is eminently complex, and shows eight breaks, several of which are very well marked. Of these, six occur at points corresponding with the hydrates already isolated by the author; the other two, which occur in weak solutions, correspond with the only two breaks found in the freezing point figure. A drawing, showing the above-mentioned breaks, attributes to the points an apparent error, agreeing almost absolutely with the known experimental error, whereas a drawing of a similar degree of complexity, placing the breaks elsewhere, gives an apparent error 6.6 times greater than the experimental error, and drawings obliterating every alternate break give errors 18 to 33 times greater. The results with potash form a simpler figure, and indicate somewhat uncertainly the existence of four breaks, one of which corresponds with the recently isolated tetrahydrate.—Phil. Mag., 1894, 359.

Relation between the Specific Gravity of a Saline Solution and the Molecular Weight of the Salt Dissolved.—George Charpy.—The density of a saline solution increases in proportion to the molecular concentration if we admit that the molecular weight of water at o° is about 3×18. The densities of solutions of analogous salts equally concentrated are approximately proportional to their molecular weights.—Compt. rend., vol. cxix., No. 2.

An Improved Specific Gravity Bottle.—H. Louis.—The new bottle differs from the ordinary type only in that the stopper is longer than usual, and is graduated, whilst a light glass cap is ground to fit accurately over the neck of the bottle, and thus to prevent the loss by evaporation that otherwise occurs during weighing, etc. It is filled in the usual way; the neck and stopper are then rapidly wiped dry, the cap is put on, and the body of the bottle dried. When weighing the bottle, any variation in the height of the column of liquid in the capillary tube must be read off on the graduations, which may be to any convenient scale. The author's graduations are $\frac{1}{20}$ inch apart, corresponding with $\frac{1}{100}$ grain of water. It is an easy matter to calibrate the tube and to make the necessary corrections. The capped bottle can be left for a long time without diminishing in weight through evaporation taking place.—Jour. Soc. Chem. Ind., 1894, 322.

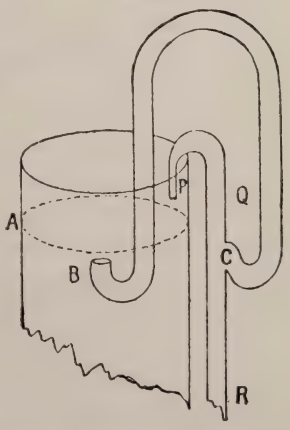
Determining the Density of Solutions.—Kohlrausch and Hallwachs describe a method of determining the specific gravity of any dilute aqueous solutions with greater nicety than has hitherto been attained. It consists in weighing a glass globe suspended in the liquid by a single cocoon silk fibre. From the weight of the globe in pure water, and also in the solution to be tested, the specific gravity is calculated as usual. The liquid

being tested is mixed by means of a glass rod bent into a horizontal ring and carrying a ring of platinum foil. During the stirring operation, the globe is supported by another ring. The thermometer used for ascertaining the temperature may be read to a thousandth of a degree by means of a telescope, but the balance used for weighing need not be of excessive delicacy. Although the globe weighed nearly 2000 grains in air, it was of such a size that it weighed less than 60 grains when suspended in water, so that the maximum weight which the silken thread was required to support never exceeded 60 grains in the experiments carried out by these observers. Their observations are said to have given indications to about the millionth part of the density determined.—Pharm. Jour. Trans., 1894, 437.

Apparatus for Determining the Specific Gravity of Soft Fats.—Z. Zawalkiewicz. The apparatus consists of a weighing bottle with two narrow necks. Of these, one comes from the base, and through it the just molten fat enters from a reservoir placed above, the excess of fat passing out from the other neck into a small chamber. By this means the bottle is completely filled with fat, and air bubbles are excluded. In order to control the temperature, the bottle and reservoirs are placed in a specially arranged glass vessel, which allows of the melting of the fat and the subsequent slow cooling to the point at which it is desired to determine the specific gravity. The paper is accompanied by a sketch of the apparatus, and gives numbers obtained for various fats.—Monatsh. f. Chem., 1894, 132.

New Automatic Siphon.—Eiloard describes (Zeitschr. f. anal. Chem., 1894, 207) a simple form of an automatic siphon for maintaining a uniform level. Although the apparatus, as illustrated in Fig. 4, is made entirely of glass, it can be more readily and quite as effectively made with rubber tubing for the upper part, a glass T tube taking the place of the portion of the figure designated as *C R* in the illustration, without necessitating any glass-blowing at all. The arm *B Q* being filled and the reservoir being filled to *P*, the siphon is put into operation automatically, and so long as the supply is delivered into the reservoir with sufficient rapidity to keep the level of the liquid above *P*, the siphon continues to act. On the liquid falling below *P* air is admitted thorough *P R* and the outflow checked. The elbow of the siphon, however, *B Q*, is left filled, and this brings the siphon automatically into action as soon as the liquid rises to the level of *P*, thus cutting off the air supply of the tube *P R*.—Pharm. Centralh., 1895, 95.

FIG. 54.



New Automatic Siphon.

The First Mercurial Thermometer.—M. Maze points out that sixty-two years before Fahrenheit made such an instrument, a mercurial thermometer was used by Ismaël Boullian (1659). It had an arbitrary scale, the value of a degree being about 10.7° C., and the zero of the scale at 53.76° C. The temperature of melting ice would be 5.34°, and that of boiling water 15.27°.—Compt. rend., cxx., 732.

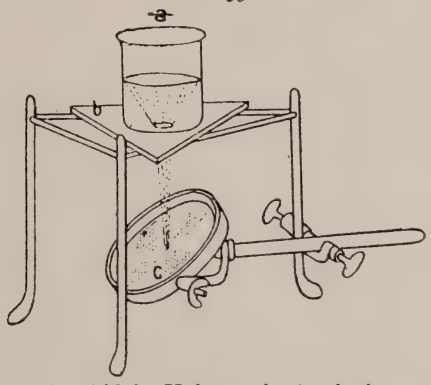
Thermometers and their Testing.—The Zeitschrift für Instrumentenkunde takes from a bulletin of the Physikalisch-technischen Reichsanstalt at Charlottenburg, the following interesting points concerning thermometers and their testing: After a thermometer has been "proved" a stamp is placed on it. This consists of the figure of an eagle, a number, and the current year. The stamp is filled with metallic bismuth, which many tests have demonstrated to be the most durable, even with the most severe handling. All thermometers destined for scientific and technical use are marked with double lines, to avoid any incompetent tampering with the scale. Since recently a concern in Thuringen has been testing thermometers and giving certificates of accuracy which resemble in form and general appearance those of the Institute, in future all of the latter will be headed and marked *Amtliche* (official). The liquid amalgam of sodium and potassium (introduced, some five years ago, by Hempel, of Berlin) would seem to be applicable for high-grade thermometers without the use of compressed gases, as its boiling point is very high (between 680° and 700° C. = 1264°–1292° F.). Experiments, however, have demonstrated that even at 300° C. the glass begins to be attacked by it, and the effect is rapidly progressive with temperature rising above this point, until at 480° the entire filling becomes black, probably through the separation of silicon. For filling thermometers for the measurement of very low temperatures (like Six's), creosote is used. For the blue colored liquid used in ordinary thermometers cuproammonium acetate and cupropyridin acetate are used. The borosilicate glass recently recommended for thermometer tubes has proven itself very effective up to 300° C., and is, therefore, much used in the manufacture of high-grade instruments. The blue striped glass, the so-called resistance glass, introduced by Greiner & Friedrichs, of Stuetzerbach, is also much used in high-class instruments. In proving thermometers for ordinary temperatures, olive oil is used for the highest point, and a solution of a mixture of potassium and sodium salts is used as baths.—Nat. Drug., 1894, 386.

Instruments for the Graduation and Calibration of Volumetric Apparatus.—H. N. Morse and T. L. Blalock describe simple apparatus whereby flasks, burettes and gas tubes may be readily verified, graduated and calibrated. It consists of a glass vessel of known delivering capacity, with a graduated stem, to which is attached at its lower end a Greiner and Friedrich's two-way stop-cock, which is in turn connected by a rubber tube with a supply of distilled water placed somewhat higher than the in-

strument itself, and also with a jet, from which the known volume of water is delivered into the vessel to be calibrated.—Amer. Chem. Jour., 1895, 479.

An Aid in Volumetric Analysis has been constructed by A. Lupp. It is intended to supply the operator with a want in determining the color-reaction more accurately and with more precision.

FIG. 55.

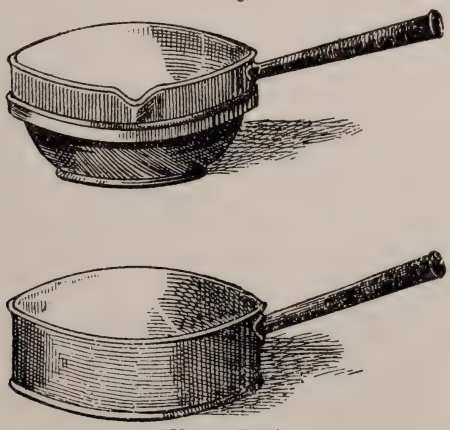


An Aid in Volumetric Analysis.

The beaker *a* containing the solution to be titrated is supported on a tripod by a triangular board or plate *b* having a small hole in the center, through which the rays of light are permitted to pass into the liquid by regulating mirror *c*.—Pharm. Centralh., 1895, p. 106; from Chemische Industrie, 1895, p. 18.

Useful Water-Bath.—Frequently when a small-sized water-bath is re-

FIG. 56.



Water-Bath.

quired, one is extemporized by fitting a cup or basin into a saucepan. The one here described takes advantage of this adaptation of domestic

vessels, resulting in a handy piece of apparatus for the retail pharmacist. The upper part consists of a lipped basin mounted in a tin rim with handle attached, the basin being made to fit the tin mount perfectly by running a little plaster of Paris underneath. The basin is of ¾-pint capacity and 5-inch diameter. The lower vessel is a shallow tin saucepan with a riveted handle, into which the upper part fits. A porcelain evaporating dish may be substituted for the basin, the cost being then considerably increased.—Chem. and Drug., 1895, Jan. 5, p. 24.

Adoption of Decimal System in Turkey.—It is announced that at the end of February, 1895, the decimal system of weights and measures will be adopted in Turkey.—Chem. News, 1894, 293.

Metric Weights on Prescriptions in Russia is brought to notice in Oester. Zeitsch. f. Pharm., 1895, 187. The Russian government has issued an order to physicians, comprising the substitution of metric weights in place of old-time apothecary weights, and makes this order obligatory to all physicians who have graduated since spring of 1894.

The Metric System in Tunis.—The metric system of weights and measures is to be introduced into the Regency of Tunis (French Protectorate) on March 1.—Pharm. Era., 1895.

Weights and Measures.—D. B. Dott is of the opinion that for prescribing and dispensing, the British system of weights and measures is to be preferred, while for analytical work the metric is more convenient. A man is more apt to write .01 Gm. instead of .001 Gm. than he is to write Gr. 1 instead of Gr. $\frac{1}{10}$, and when the writing is preceded by a calculation, there is even greater liability of the decimal point going wrong.—Pharm. Jour. Trans., 1894, 311.

The Estimation of Weight.—M. Flournoy has recently made some interesting experiments on this subject, which he has described before the Geneva Society of Physics and Natural History. According to the report in La Revue Scientifique (Lit. Digest.), he took ten common objects of identical weight, but of various dimensions, and asked the persons on whom he wished to experiment to arrange them according to weight. Of fifty persons, only one discovered that all the objects weighed the same. All the others placed as the lightest an empty box of considerable size, and as the heaviest a little metal box filled with lead. It may be thus seen that the apparent weight of bodies is in inverse ratio to their volume. When the sensations of contact were eliminated, without eliminating the visual impressions, as could be done by holding the objects by a cord instead of directly by the fingers, the same errors persisted. It is only when the subject's eyes are shut that he recognizes the equality of weight of the objects.—Pharm. Era, 1895.

Weights and Measures.—The Select Committee of the House of Commons appointed to inquire into the existing systems of weights and meas-

ures in this country, and whether any, and if so, what alterations are necessary, had a meeting last week, under the presidency of Sir H. Roscoe. Evidence was given by Mr. H. J. Chaney, who described the system under which the verification of legal standards is carried on at the Board of Trade by experts appointed for the purpose, and also gave an account of the different systems of weights and measures now in use in the United Kingdom. He stated that the imperial and the metric systems were the only ones with which the department had to do in England, but there were other local customary weights and measures in use. There were many weights and measures in use which were not legally recognized. Among these he mentioned the carat, the boll (used in Scotland), the ell, the coomb (used for measuring corn), the Winchester bushel, the butcher's stone of 8 lbs., the miner's dish (used for weighing ore in Derbyshire), and the gauge (used in measuring plates) as examples of weights and measures which were not recognized by law. A number of anomalies which formerly existed—*e. g.*, a ton of stone being different from a ton of other materials, &c.—had disappeared to a great extent under the operation of the Weights and Measures Acts of 1878 and 1889. The Scotch and Irish mile were still locally recognized, but for all statutory purposes a mile was 1,760 yards. Practically, the only two countries of any importance in Europe in which the metric system was not adopted were Great Britain and Russia. In Germany, Austria, France, Italy, Spain and Portugal, the metric system was the only system in use.—Brit. and Col. Drug., 1895, 235.

British Pharmacists and the Metric System.—At a Council meeting of the Pharmaceutical Society of Great Britain, W. Martindale moved the following resolution: "That after the first day of January, 1895, a practical knowledge of the metric system of weights and measures shall be required of all candidates for the Minor examination in the subjects of prescriptions and practical dispensing, and that the Board of Examiners be instructed to require from candidates a general knowledge of posology in terms of the metric as well as the British system of weights and measures as defined by the British Pharmacopœia, 1885; and in practical dispensing 'to weigh, measure, and compound medicines' by the metric as well as the British system of weights and measures." After some discussion, the resolution was altered to the effect that the Board of Examiners should be requested to consider the advisability of requiring a practical knowledge of the metric system of weights and measures for the Minor examination. In this form it was carried.—Amer. Drug. and Pharm. Rec., 1894.

Prescription and General Notes.

Dispensing Notes.—E. W. Hill (Chem. and Drug., 1895, 483), while preparing some pills of sodium nitrite, found that in the presence of organic matter this salt decomposes. When massed with extract of gentian the pills become swollen, crack, and evolve red fumes. Kaolin ointment, however, makes a stable and satisfactory pill, it is stated. Blaud's pills may be nicely polished by rotating them, after they have become somewhat hardened, with a small quantity of powdered graphite. Experience has proved this method to be a very good one. According to E. W. Hill, bromoform can be thoroughly emulsified by means of tincture of quillaja. He has tried to dispense this medicament by suspension in mucilages of acacia and tragacanth, but neither of these answered satisfactorily; however, by employing tincture of quillaja in the proportion of two parts to one part of bromoform, a permanent mixture is readily obtained.

Chromic Acid and Cocaine Hydrochlorate.—James McBain, on the dispensing of the following prescription:

℞ Acid. chromic ..... 4 grains.
Cocain. hydrochlor ..... 7 "
Aquæ ..... ℥ii.
Solve.

This acid was dissolved in ℥i. of water, and the cocaine hydrochlorate in the other ℥i. of water. On mixing the two solutions the whole became thick from the separation of an orange-yellow precipitate. The action seems similar to that of the United States Pharmacopœia test, in which, on adding 5 C.c. of a 5 per cent. solution of chromic acid, to 5 C.c. of a 2 per cent. solution of cocaine hydrochlorate, a yellow precipitate is produced, which re-dissolves on shaking, and again separates as a permanent precipitate on the addition of 1 C.c. of hydrochloric acid. In this case the precipitate did not re-dissolve on shaking, and the alkaloidal salt on examination was found to be slightly acid. On applying to the prescriber, he said the cocaine could be omitted, as it was intended to mitigate the pain produced by chromic acid applied as a caustic.

Mr. Hill said this was somewhat analogous to the use of cocaine along with nitric acid. Perhaps the object of the prescriber could have been attained by applying a solution of cocaine first, and after giving time for the production of local anæsthesia, applying the chromic acid solution.—Brit. and Col. Drug., 1893, 132.

Codeine Sulphate with Hydrobromic Acid.—Wm. Duncan (Brit. and Col. Drug., 1894, 619), relates the following instructive experiment: The following prescription was handed to him for an explanation of the decomposition which ensues on dispensing:

Codeine Sulphate .....9 grains.
Dil. Hydrobrom. Acid .....4 fl. dr.
Solution of Strychnine .....1 "
Glycerin .....3 "
Acid Infusion of Roses .....to make 3 fl. oz.

Concentrated infusion was used. On dissolving the alkaloidal salt in water and adding the hydrobromic acid, abundant crystallization resulted. The crystals re-dissolved on heating, but again separated out on cooling. On adding the other ingredients of the prescription, the crystals slowly and almost completely re-dissolved—the glycerin probably exerting a powerful solvent action. The crystals, washed free from adhering acid, were found to be neutral to litmus, readily soluble in water, but only sparingly in dilute hydrobromic acid. Chemical examination proved them to be codeine hydrobromate. It seems, therefore, that this salt resembles strychnine and other alkaloidal salts in being much less soluble in acid than in water. It is therefore advisable in dispensing alkaloidal salts with excess of acid to put on a "shake well" label, to avoid any risk from unforeseen crystallization.

Dispensing Difficulities.—G. Roe (Chem. and Drug., 1895, 241) brings together the following:

Tincture of ferric chloride ..... 4 drams.
Carbolic acid ..... 1 dram.
Sulphurous acid ..... 3 drams.
Water, enough to make ..... 8 ounces.
Make a gargle.

A dark mixture is produced, changing to a colorless solution, the sulphurous acid bleaching the color caused on mixing the tincture with the carbolic acid.

Potassium chlorate ..... 5 grains.
Calcium hypophosphite ..... 5 grains.
Magnesium sulphide ..... 10 grains.
Ferrous sulphate ..... 2 grains.
Solution of strychnine ..... 2 minims.
Water, enough to make ..... 1 ounce.

The iron and calcium salts react, giving a precipitate of insoluble calcium sulphate and iron hypophosphite.

Sodium salicylate ..... 10 grains.
Ammonium carbonate ..... 3 grains.
Spirit of nitrous ether ..... 20 minims.
Spirit of chloroform ..... 10 minims.
Water, enough to make ..... 1 ounce.

Changes to a red color. It is better to add the spirit of nitrous ether to the ammonium carbonate, then the change does not take place so quickly.

Codeine	2 grains.
Diluted phosphoric acid	q. s.
Dilute hydrocyanic acid	20 minims.
Tincture of iodine	10 minims.
Water, enough to make	4 ounces.

Mix.

The tincture of iodine causes brick-red precipitate of alkaloid, which is re-dissolved on adding the dilute hydrocyanic acid. Hydrocyanic acid dilute and tincture of iodine precipitate, but re-dissolve immediately.

Solution of arsenic	5 minims.
Solution of corrosive sublimate	1 dram.
Spirit of chloroform	15 minims.
Water, enough to make	1 ounce.

A heavy precipitate falls, which may be a compound of mercury and arsenic; substituting the acid solution of arsenic a clear mixture results.

Mercury subchloride	½ dram.
Solution of calcium saccharate	1 ounce.

Add to pint of water.
Make lotion.

No apparent change other than might be expected occurred at the time of mixing; but after a few weeks the black precipitate began to get lighter in color. Mercuric chloride and a diluted solution of saccharate of calcium do not give the yellow oxide as the result of the chemical decomposition, but always the red variety; and, what is rather singular, different results are obtained by mixing them in different manners. For instance, when the aqueous saccharate of calcium is gradually added to the mercuric salt a dark red precipitate is obtained; but if the water be added quickly, hardly any precipitate results; in fact, on using a glycerine-and-water solution of mercuric chloride (5 gr. to 1 drachm), and adding the saccharated lime-water quickly, quite a clear solution results.

Potassium bromide	10 grains.
Antipyrine	5 grains.
Tincture of ferric chloride	10 minims.
Spirit of chloroform	10 minims.

Water, enough to make 1 ounce.
Make a mixture.

The characteristic color is produced, which is almost discharged by adding five times the quantity of water. It was suggested that the probable discharge of color in the first prescription was due to the reduction of the perchloride to the ferrous state, as ferrous salts do not color with carbolic acid.

The fourth prescription seemed to occasion surprise to most, in that the

small amount of hydrocyanic acid should dissolve the alkaloid precipitated by the iodine. This, it was suggested, resulted from formation of hydriodic acid by action of hydrocyanic acid on tincture of iodine. The black precipitate in the fifth could not be satisfactorily accounted for, but all agreed that it was the correct thing to substitute the acid solution of arsenic.

Another Explosive Mixture.—At the Société de Thérapeutique de Paris M. Créquy called attention to the following dangerous prescription for a tooth powder:

Chlorate of potassium	5 grams.
Borax	10 "
Calcined magnesia	10 "
Prepared chalk	10 "
Oil of peppermint	11 drops.
Saccharin	50 centigrammes.

The pharmacist first mixed the chlorate with the saccharin in a mortar; a violent explosion at once resulted. The dispenser was severely burned, and serious damage was caused to the pharmacy.—Nouv. Remédes; Brit. and Col. Drug., 1894, 470.

The Incompatibles of Chloride of Lime.—Jorissen gives an account of some experiments on the incompatibilities of this body, amongst which the chief are the following, on account of the dangers of explosion: glycerin (unless diluted with water), fats, oils and essences, iodides and ammonium chloride. In the latter case, there is some danger of nitrogen chloride being formed.—Jour. de Pharm. d'Anvers; Amer. Drug. and Pharm. Rec., 1894.

Analysis of Prescriptions.—As bearing on the proposed Imperial Pharmacopœia, it is interesting to note some figures given by Mr. E. Norton Grimwade in the Australasian Journal of Pharmacy (Brit. and Col. Drug.) and compiled from prescriptions dispensed in Melbourne, Bendigo and Ballarat. The "highest number of times" dispensed is scored by syr. aurant., with 357 in 2,500 prescriptions. Cocain. mur. comes lowest of the commoner medicaments, with 72. After this the table only mentions articles used very little, most of them only once. The following table shows the range between the two medicaments mentioned above, and 30 most commonly used ingredients, as shown by the tables of Mr. Martindale.

COMPARISON IN PERCENTAGES OF THE 30 MOST USED INGREDIENTS FROM THE ANALYSIS OF—

12,000 Prescriptions compiled by W. Martindale, Esq., F. C. S.	Per Cent.	*2,500 Prescriptions (comprising 1,500 from Melbourne, 500 from Bendigo, and 500 from Ballarat) compiled by E. Norton Grimwade.*	Per Cent.
Spts. chloroformi	9.3	Syrup. aurant.	14.3
Tinct. nuc. vomic.	8.25	Tinct. nuc. vom.	14.0
Glycerin	7.3	Glycerin	7.76
Sod. bicarb.	6.7	Spts. ammon.	7.6
Syrup. aurant.	6.63	Spts. chloroformi	7.6
Spts. ammon. aromat.	5.62	Pot. bicarb.	7.4
Quininæ sulphas.	4.98	Spts. ether. nit.	7.0
Vinum ipecac.	4.2	Mag. sulph.	6.64
Pot. bicarb.	3.86	Potass. iodid.	6.6
Aqua chloroformi	3.6	Quininæ sulph.	5.72
Ammon. carb.	3.3	Sod. bicarb.	5.44
Acid. boricum	3.25	Sod. salicylas	5.1
Syrup. simplex	3.1	Acid. nitro-hydrochl. dil.	4.68
Aqua menth. pip.	3.1	Infus. gent. co.	4.6
Liq. strych. hydrochlor	3.1	Hyd. subchlor.	4.56
Pot. brom.	3.04	Liq. strych. hydrochlor.	4.56
Ac. nitro-hydrochlor. dil.	2.96	Infus. calumb.	4.4
Pot. iodid.	2.96	Tinct. digitalis	4.01
Liquor arsenicalis	2.93	Tinct. card. co.	3.8
Liquor ammon. acet.	2.8	Vinum ipecac.	3.76
Sod. salicylas	2.7	Acid. boric.	3.6
Tinct. camph. co.	2.6	Pot. chloras	3.5
Syrup. tolu.	2.6	Mist. pepsin. co.	3.52
Tinct. card. co.	2.5	Syr. zingib.	3.44
Vaseline	2.5	Liq. ammon. acet.	3.34
Extract. belladonn.	2.5	Extract. cascar. sag. liq.	3.2
Tinct. digitalis	2.5	Acid. hydrocyan. dil.	3.2
Extract. nuc. vom.	2.4	Tinct. hyoscyam.	3.04
Pil. hydrarg.	2.35	Acid. sulph. dil.	3.0
Spts. ether. nit.	2.27	Cocain. mur.	2.88

The Letter "℞" in Prescriptions.—E. H. Gane (Chem. and Drug., 1894, 828; Amer. Drug. and Pharm. Rec., 1894, 10) says: Apart from any question of its superstitious origin—which to his mind was satisfactorily settled in a letter to the Chem. and Drug. by Otto Wall, about two years ago—it seems to him that the derivation from "recipe" is open to considerable objection. The sign is one of great antiquity, and the old prescription writers were better Latin scholars than their confréres of to-day, and would hardly be likely to fall into the error of using the word "recipe" to indicate the words "take thou." A reference to any Latin dictionary will show that the verb recipio is never in classical works used in that sense, but always in the sense of taking or receiving from the hands of some one else, which is quite a different meaning from that of taking in the sense of taking and using. The Latin verb for the latter is capio, and

this, apart from Latin writers, is supported by the fact that the directions in a prescription always read capiat cochleare, etc., and never recipiat cochleare, etc., when a patient is directed to dose himself. Occasionally we find the words habeat cochl., etc., indicating the physician's directions to some one else to administer the medicine. The true meaning of the word "recipe" is well shown in the words recipe ferrum, which the Roman populace were in the habit of using at their gladiatorial shows to indicate that the vanquished man was to receive his death blow and not be spared by the victor.

The earliest reference he can find in which the verb recipio is used in the sense of taking and using is in the "Compositiones Medicamentorum" of a physician named Scribonius Largus, who flourished about 50 A. D. The sign "℞" is, however, much older than that.

A Non-repeating Prescription Blank.—With a view to prevent the unauthorized and indiscriminate renewal of prescriptions, G. R. Schimmel, Bull. of Pharm., Vol. viii, 457, suggests the following form of prescription-blank:

Dispenser's Stub { Returnable to the Prescriber in five days from date.

Private Formula.

No copy. No repetition. Date, 189

℞

Sent to

Dispensed by M. D.

No.

Book

Book

Patient's Stub. No.

Date 189

Directions .....

.....

.....

.....M. D.

Dispensed by.....

A Table of Solubilities for the Prescription Counter.—W. B. Parker (Drug. Circ., 1895 [June], p. 123), gives the following:

	Grs. sol. in 1 oz. Water.	Grs. sol. in 1 oz. Alcohol.
Acid, arsenic	12	2
benzoic	1	226
boric	19	30
carbolic	52	all pro.
chromic	....	dec.
citric	75	288
gallic	5	90
salicylic	1	189
stearic	ins.	10
tannic	450	738
tartaric	569	180
Alum	50	ins.
dried	26	ins.
Aluminum hydrate	ins.	ins.
sulphate	375	ins.
Ammonium, benzoate	91	16
bromide	300	15
carbonate	89	dec.
chloride	153	alm. ins.
iodide	449	51
nitrate	902	23
Antimony and potassium tartrate	26	ins.
oxide	ins.	ins.
sulphide	ins.	ins.
sulphate	ins.	ins.
Apomorphine hydrochlorate	10½	10
Arsenic iodide	65	15
Atropine	3½	150
sulphate	1,132	73
Benzine	ins.	73
Bismuth, citrate	ins.	ins.
and ammonium citrate	11	10
subcarbonate	ins.	ins.
subnitrate	ins.	ins.
Bromine	15	dec.
Caffeine	6	14
Calcium, bromide	650	451
carbonate, precipitated	ins.	ins.
chloride	303	56
sulphate	1	ins.
Chalk	....	ins.
Camphor, monobromated	nearly ins.	321
Cerium, oxalate	ins.	ins.
Chloral, hydrate	v. s.	v. s.
Chrysarobin	ins.	1
Cinchonidine sulphate	6½	6
Cinchonine	0.13	4
sulphate	6	45
Cocaine hydrochlorate	950	130
Codeine	57	151
Chalk, prepared	6	ins.
Copper, sulphate	18	alm. ins.
Elaterium	0.1	3½
Hydrastine hydrochlorate	1,600	152
Hyoscine hydrobromate	237	35
Hyoscyamine hydrobromate	1,500	225
sulphate	900	21
Iodoform	alm. ins.	9
Iodine	0.1	45
Iron, chloride	v. s.	
citrate	v. s.	ins.
and ammonium citrate	v. s.	ins.
and ammonium sulphate	150	ins.
and ammonium tartrate	v. s.	ins.
and potassium tartrate	v. s.	ins.
and quinine citrate	v. s.	ins.
and strychnine citrate	v. s.	sp. sol.
hypophosphite	....	ins.
lactate	11	ins.
phosphate	v. s.	ins.
pyrophosphate	v. s.	ins.
sulphate	150	ins.
sulphate, granulated	250	ins.
valerianate	ins.	v. s.
Lead acetate	191	21
iodide	0.2	alm. ins.
nitrate	223	alm. ins.
oxide	alm. ins.	ins.
Lithium benzoate	115	38
bromide	750	700
carbonate	5	ins.

	Grs. sol. in 1 oz. Water.	Grs. sol. in 1 oz. Alcohol.
Lithium citrate	225	
salicylate	310	v. s.
Magnesia	alm. ins.	ins.
heavy	alm. ins.	ins.
Magnesium carbonate	alm. ins.	ins.
sulphate	300	ins.
Manganese sulphate	560	ins.
Menthol	1	
Mercury bichloride	28	150
cyanide	35	30
iodide, red	alm. ins.	3
oxide, yellow	alm. ins.	ins.
oxide, red	alm. ins.	ins.
subsulphate	0.2	ins.
ammoniated	alm. ins.	ins.
Morphine alkaloid	0.1	3½
acetate	180	9
hydrochlorate	18	7
sulphate	32	0.6
Naphthalin	ins.	30
Naphthol	0.4	601
Phosphorus	ins.	1½
Physostigmine salicylate	3	37
sulphate	....	v. s.
Picrotoxine	2	51
Pilocarpine hydrochlorate	v. s.	v. s.
Piperin	ins.	15
Potassium acetate	1,150	238
bicarbonate	140	al. ins.
bichromate	45	ins.
bitartrate	2	al. ins.
bromide	275	2
carbonate	411	ins.
chlorate	270	ins.
citrate	801	10
cyanide	225	11
and sodium tartrate	325	ins.
ferrocyanide	113	ins.
hydrate (potassa)	887	225
hypophosphite	738	62
iodide	610	24
nitrate	120	ins.
permanganate	30	dec.
sulphate	462	ins.
Pyrogallol	265	451
Quinidine	5	52
Quinine (alkaloid)	¼	74
bisulphate	46	14
Quinine precipitated	ins.	sl.
sublimed	ins.	sl.
iodide	ins.	dec.
hydrobromate	8	759
hydrochlorate	13	152
sulphate	0.6	7
valerianate	4½	91
Resorcin	737	902
Sugar (cane)	903	2½
milk	76	ins.
Salicin	16	15
Salol	alm. ins.	45
Santonin	alm. ins.	10
Silver, cyanide	ins.	ins.
iodide	ins.	ins.
nitrate	735	13
nitrate, fused	735	13
oxide	½	ins.
Sodium acetate	326	15
arsenate	110	alm. ins.
benzoate	251	10
bicarbonate	40	ins.
bisulphate	113	6
borate	30	ins.
bromide	375	32
carbonate	300	ins.
chlorate	401	4½
chloride	125	alm. ins.
hydrate (soda)	265	v. s.
hypophosphite	454	15
hyposulphite	700	ins.
iodide	758	151
nitrate	350	4½
nitrite	303	v. s.
phosphate	82	ins.
pyrophosphate	38	ins.
salicylate	501	72
sulphate	125	ins.
sulphite	113	spar.
sulphocarbolate	90	3
Sparteine sulphate	210	v. s.
Strontium bromide	425	v. s.
iodide	750	
lactate	398	
Strychnine	.06	4
sulphate	9	4
Sulphur, washed	ins.	spar.
Terebene	slightly	v. s.
Terpin hydrate	2	44
Thymol	.37	450

	Grs. sol. in 1 oz. Water.	Grs. sol. in 1 oz. Alcohol.		Grs. sol. in 1 oz. Water.	Grs. sol. in 1 oz. Alcohol.
Veratrine	6	150	Zinc iodide	undeter.	v. s.
Zinc acetate.....	160	13	oxide	ins.	ins.
bromide	undeter.	v. s.	phosphide	ins.	ins.
carbonate, precip .	ins.	ins.	sulphate	758	ins.
chloride	1,510	v. s.	valerianate	4½	11

Pharmacy Notes.—T. S. Wokes.—In making Mistura Guaiaci, Br. P., by using tragacanth instead of acacia, as recommended by Squire, a better and more satisfactory preparation results, using ¼ quantity. Lump sugar may also be used in place of the powder, as it tends to separate the guaiac better. In making Glycerin and Cucumber, instead of rubbing up the pomade and soap with cold water, melt the pomade on a water-bath, and dissolve the soap in the water separately. Then put together, and shake the solution frequently until near cold, finally adding glycerin and perfume. Of course the exact amount of soap necessary to get the consistency desired should first be determined. In making suppositories, if the cocoa butter is heated beyond a certain degree some change seems to take place in its composition, as in such cases it will often remain semi-fluid a considerable time after getting cool. Several members of the society said they had noticed the same fact, but no remedy could be suggested, except that care should be taken in the melting of the cocoa butter. A mixture containing sodium sulphocarbolate, magnesium carbonate, compound tincture of cardamom, and water, developed a brown color on standing a little while, instead of remaining pink. It was suggested that the sodium sulphocarbolate was contaminated with traces of iron; hence the change in color. A mixture containing pepsin and bismuth, with syrup, tinctures and water, gave some trouble. The bismuth and pepsin were lightly rubbed in a mortar with water, and added to remainder of the ingredients. Shaking before filling up gave a froth, which could not be got rid of by ordinary means. It was asked whether we should dilute mercury oleate with oleic acid or with vaselin. The opinion of the meeting was that it is only right to reduce with oleic acid, and not with vaselin, although the latter makes a better preparation for use. Aqua menthæ piperitæ or viridis? A great difference of opinion existed on this point, but the majority were for using aqua menthæ piperitæ, unless it was positively known viridis was intended. Should we always put "Shake well!" labels on mixtures containing hydrocyanic acid? In view of the fact that the active ingredient would exist largely in the partly-emptied bottle as a gas, it was, after some discussion, agreed that the bottles should be so labeled. When minute quantities of powerful ingredients are ordered in a pill, how large should we make them? It was generally advocated that all small pills should be made about one grain (6 Ctg.) each. When ordinary blisters are ordered, should we paint them over with anything to increase their efficacy? In reply to this, some said to use liquor epispasticus; some,

acetic acid; others, olive oil, and a few, nothing. When the prescriber makes an obvious error, or anything which might be misconstrued, in a prescription, should not the first dispenser mark it, so that subsequent ones know what course to pursue? Yes, said the meeting.—Merck's Mark. Report, 1895, 157.

Some Pharmaceutical Notes.—F. W. Haussmann (Am. Journ. Pharm., 1895, p. 85) alludes to a number of interesting pharmaceutical phenomena, and offers explanations for same. The first relates to the coloration frequently produced in mixtures by glycerin, which the author refers to the presence of iron in the latter. The practice of keeping glycerin in tinned iron cans, often for a prolonged time, has the effect of contaminating the same with traces of the metal, and such glycerin produces color changes which are at times difficult of explanation, and the source of considerable trouble. Glycerite of tannin not infrequently turns a blackish-brownish color during preparation, no matter how careful we may be in handling the working utensils; examination of glycerin which appears to contain the metal in the ferric form, will reveal the cause of the coloration. Extemporaneously prepared nipple washes containing tannic acid, or similar preparations, are apt to show the same effect, as will also preparations containing tannin-like principles. In this connection, the author incidentally calls attention to the presence of tannic acid in alcohol. The average pharmacist accepts this article from his dealer without even attempting a superficial examination as to its purity, and does not recognize the importance of the same until he finds color changes in delicate preparations, such as elixirs containing iron salts. Such alcohol, or preparations made therefrom, when mixed with glycerin that has been kept in tinned-iron cans, will show the same effect. The delicacy of the iron reaction with phenol compounds is well-known. Carbolic acid is often prescribed in a mixture with glycerin, and if the latter is not free from iron a red coloration will take place. Salicylic acid and its salts, particularly the sodium salt, are readily affected in this manner, as are also tincture of guaiac, served with antipyrine, salipyrine and a number of the newer remedies. The author next points to the interaction of glycerin and borax. The fact that glycerin, when added to aqueous solutions of borax, decomposes the latter with liberation of boric acid, is well-known; and the cause of the effervescence in preparing Dobell's solution finds its explanation in this manner. Aqueous tincture of rhubarb, a preparation frequently prescribed by German physicians, contains, besides the active vegetable ingredients, borax and potassium carbonate. When mixed with glycerin, the latter decomposes the borax, with liberation of boric acid, and the latter, in its turn, is neutralized by the potassium carbonate present, with the evolution of carbonic acid. The expansion of this gas renders the bottle holding the mixture liable to fracture. Several objections have been made against the addition of borax to the cold cream of the

United States Pharmacopœia, the chief of which appears to be the action on the salts of mercury and the alkaloids. But the addition of glycerin to cold cream, as sometimes ordered in prescriptions, will decompose the borax in the manner mentioned. This incompatibility should be remembered when about to add glycerin (or preparations containing glycerin—certain fluid extracts and tinctures) to any preparation containing borax —such as bay rum, toilet washes, etc. Mr. Haussmann next refers to vinegar of squill of a reddish-brown color and a bitter taste as sometimes met with. Having occasion to examine a number of samples of the vinegar, the author noticed the odor of acetic ether and the presence also of alcohol. This he refers to the alcohol of the fluid extract which appears to have been used in the preparation of the objectionable vine gars—the alcohol and acetic acid entering into combination to form acetic ether. On heating the vinegar the latter is dissipated, together with the excess of alcohol; hence the odor of the ether is not so prominently noticeable in the syrup made by heat. The practice of easy preparation of this official vinegar should be discouraged. Finally, the author alludes to the presence of ultramarine in syrups. The addition of this pigment to sugar by the refiner for the purpose of "whiting" same is to the pharmacist at times the source of some trouble, not alone in the preparation of medicinal syrups, elixirs and allied saccharine preparations, but also in the manufacture of soda-water flavors. Acid syrups made with such sugar evolve sulphuretted hydrogen from the action of the free acid on the sodium sulphide present in the ultramarine. Syrups containing free alkali —such as rhubarb and senega—do not evolve sulphuretted hydrogen, since the ultramarine remains unaffected by alkalies.

Identity Tests of a few Galenical Preparations.—E. Bourguelot publishes (in Jour. de Phar. et de Chim., vol. xv., 361), a few tests intended to be applied to preparations official in the French Codex, but which are applicable also to many of the U. S. P. preparations. These tests are simple and require no special apparatus, and are, therefore, very practical.

(1) *Tincture of Colchicum:* 5 C.c. of the tincture, diluted with 2.5 C.c. of distilled water, are shaken in a separating flask with 10 C.c. of chloroform; allow to settle, then receive the chloroformic solution in a porcelain capsule, and evaporate to dryness on a water-bath. If a few drops of concentrated sulphuric acid are added to the residue, a deep yellow coloration will be produced. If now a glass rod, previously dipped in nitric acid, is passed over the yellow mixture, a violet-pink color is developed at the point of contact, which quickly disappears. These reactions are due to the colchicine, which is soluble in chloroform.

(2) *Tincture of Nux Vomica:* 10 or 12 drops of the tincture are mixed in a porcelain capsule with 3 drops of a 30 per cent. solution of sulphuric acid; the mixture is now carefully evaporated by slowly rotating the capsule over the flame of an alcohol lamp. The sides of the dish which have

been touched by the tincture will acquire a nice purplish-red coloration. This reaction is attributed to the action of sulphuric acid on loganin, a glucoside related to arbutin, discovered by Dunstan and Short in the seed of the genus strychnos.

(3) *Tincture of Aloes:* 5 C.c. of the tincture are shaken with 2.5 C.c. of distilled water and 20 C.c. of ether. After allowing to settle, 5 C.c. of the ethereal solution are decanted into a test tube containing 2 C.c. of water; two drops of water of ammonia are now added. The lower aqueous layer acquires a cherry-red color; while the upper, ethereal layer is completely decolorized.

(4) *Extract of Colchicum:* Dissolve by heat 0.5 Gm. of the extract in 5 C.c. of water, add 10 C.c. of 90 per cent. alcohol, allow to settle, and filter. Five C.c. of the filtered liquid are now shaken in a separating flask, with a mixture containing chloroform 10 C.c. and ether 5 C.c. After separation, receive the lower strata in a porcelain capsule, evaporate to dryness on a water-bath, and treat as indicated under tincture of colchicum. Ether is in this case added, to prevent the chloroform from forming an emulsion with the solution of the extract; the separation of the liquids is then effected in a few minutes.

(5) *Oleoresin of Cubebs:* A small quantity of the oleoresin is spread on a porcelain evaporating-dish, and a glass rod, previously dipped into sulphuric acid, is passed over it. A red color is immediately produced, due to the action of the sulphuric acid on cubebin.

(6) *Extract of Cascara Sagrada* (official in the Codex): 0.5 Gm. of the extract is dissolved in 5 C.c. of water; this turbid solution is shaken with 20 C. c. of ether; after separation pour 5 C.c. of the ethereal layer into a test-tube, and add 2 C. c. of distilled water and two drops of water of ammonia. On shaking this mixture, the aqueous layer acquires a cherry-red color. This reaction is due to the emodin contained in cascara sagrada bark. But as emodin, aloin and chrysophanic acid produce with ammonia nearly identical color reactions, the above test would obviously not be sufficient to distinguish between extract of cascara and the extracts of rhubarb and aloes. This can be done, according to Dieterich, by noticing the different color reactions which are produced by the action of sulphuric acid on the residue left after the evaporation of the ethereal liquid obtained in the above process. If a glass rod dipped into sulphuric acid is passed over the yellow residue, a saffron-yellow color will be produced in the case of cascara sagrada, a brownish-yellow one in the case of aloes, and a pinkish one with rhubarb.

(7) *Honey of Roses.*—Mix 5 C.c. of the honey with an equal volume of water, and add 10 C.c. of ether; allow to settle, and decant the ethereal solution into a test-tube; add 2 C.c. of water, then one drop of ferric-chloride solution previously diluted, and shake. The aqueous layer will

acquire a greenish-black color, due to the tannin contained in the rose leaves.

(8) *Syrup of Orange Peel.*—5 C.c. of the syrup, mixed with an equal volume of water, are shaken with 20 C.c. of acetic ether; allow to stand; after separation decant the ethereal liquid and evaporate it to dryness. If to the residue a few drops of concentrated sulphuric acid are added, a yellow color is produced, which gradually darkens. A solution of sodium hydroxide produces a similar but lighter coloration. These reactions seem to be due to the presence of hesperidin and isohesperidin, both of which, but especially the latter, are soluble in acetic ether.

(9) *Syrup of Rhubarb.*—5 C.c. of the syrup are first shaken with an equal volume of water, then with 20 C.c. of ether; set aside, then decant the yellow ethereal solution, of which 5 C.c. are poured into a test-tube, 2 C.c. of water are added, and, lastly, 1 drop of water of ammonia, and the whole shaken. The watery layer will be colored a cherry-red, while the ethereal solution becomes decolorized. The reaction is due to the chrysophanic acid of the rhubarb.

(10) *Ointment of Poplar Buds* (Pomatum Populeum of the Codex): Dissolve, by gentle heat, 3 or 4 Gm. of the ointment in 10 C.c. of 90 per cent. alcohol; shake, allow to cool, and decant the greenish alcoholic solution. On the addition of two drops of soda solution (Codex) to the above solution, a characteristic yellow color is produced. This reaction is due to chrysin, found in poplar buds, which is soluble in alcohol. The "baume tranquille" of the Codex, which contains all of the ingredients contained in the ointment of poplar buds, except the poplar buds, does not give the above reaction.

Pharmaceutical Preparations.

Assay of Drugs.

Titration of Pure Alkaloids.—A. R. L. Dohme, upon determination of a number of alkaloids with volumetric acid solutions, concludes that for nearly all alkaloids the method of titration with volumetric acid solution is applicable and gives results that are true or nearly so. The exceptions are such alkaloids as narceine, colchicine, etc., that either do not neutralize acids or are themselves so highly colored that volumetric analysis cannot be advantageously applied to them—New. Eng. Drug., 1895, 11.

The Breaking up of Emulsions of Chloroform and Ether in Alkaloidal Assays.—All chemists who have had experience in the extraction of alkaloids from liquid solutions by shaking with an immiscible solvent, as chloroform, ether, etc., have doubtless experienced annoyance in the partial emulsion which is liable to ensue, causing delay and oftentimes extra work. Alexander Gunn recommends (Chem. & Drug.) filtration under pressure as the best means of breaking these. He places the

emulsion in a glass tube which has been drawn to a small orifice at its lower end, the latter being then stopped with a bit of absorbent cotton to effect filtration. The tube is then fitted through the cork of a receiving flask, and the latter connected with an aspirator or air-pump and the air exhausted. The mixture separates in filtering, and it is only necessary to wash the cotton and flask with fresh chloroform to recover all of the alkaloids. A cinchona emulsion which had stood two weeks without separating was quickly separated by this method.—West. Drug., Jan., 1895.

Valuation of Drugs and Galenicals.—H. Beckurts(Pharm. Centralh., 1894, 566). After some remarks upon the importance of a chemical examination of drugs and galenicals, the author submitted the results of further work along the line shown in his paper presented at the last general meeting of the German Pharmaceutical Society, which results are summarized below:

Nux Vomica.—The alkaloid was estimated as follows:

A.—By percolating 10 Gm. of the powdered drug with diluted alcohol, shaking out the alkaloids according to Beckurts' method with chloroform from an ammoniacal solution, and titration with centinormal acid solution.

B.—By percolating with diluted alcohol and shaking out the alkaloids according to Beckurts' method with ether and chloroform.

C.—By digestion of the powdered seed and shaking out as under A.

D.—By digestion of the powdered seed with diluted alcohol and shaking out as under B.

E.—By a method based on that of Keller.

The percentage results obtained were as follows:

	A.	B.	C.	D.	E.
1.	3.39	2.4	2.25	2.15	2.112, 2.169
2.	2.38	2.36	2.27	2.16	2.1184, 2.25

Belladonna Leaves.—The alkaloidal content was determined by the following methods:

A.—By percolating the powdered belladonna leaves with a mixture of alcohol and chloroform, and shaking out three times according to Beckurts' method.

B.—Same as above, but using ether-chloroform for shaking out.

C.—By digestion with diluted sulphuric acid and shaking out three times with chloroform.

D.—By digestion with diluted sulphuric acid and shaking out once with ether-chloroform.

E.—By a method based on that of Keller.

The percentage of atropine obtained was as follows:

	A.	B.	C.	D.	E.
1.	0.486	0.4826	0.458	0.493	0.4797
2.	0.42772	0.40171	....	....	0.4101
3.	0.509	0.50575			

Belladonna Root.—The alkaloidal content was determined in the same manner as with the leaves. The percentages present are shown herewith :

	A.	B.	C.	D.	E.
1.	0.5404	0.566	.....	0.5139	0.5433
2.	0.53176	0.5346	.....	.....	0.5317
3.	0.53754	0.52309	0.5163		

Hyoscyamus Herb.—The determinations were made in the same manner as with belladonna leaves and root. The following percentages of atropine were found :

	A.	B.	C.	D.	E.
1.	0.09726	0.09537			
2.	.....	0.08862	0.0896	0.09	0.0712
3.	.....	0.08959	.....	....	0.0722

Stramonium Leaves.—The same methods were used as for belladonna. The percentages of alkaloid found were as below :

	A.	B.	C.	D.	E.
1.	0.3179	0.3083	0.36	0.332	0.370
2.	0.3179	0.3198	...	0.3082	

Conium Herb.—The following percentages of alkaloid were found according to processes A and B :

	A.	B.
1.	0.0385	0.03175
2.	0.03386	0.03487
3.	0.03083	

Ipecac Root.—Following the same processes as with belladonna, the annexed percentages of emetine were found :

	A.	B.	C.	D.	E.
1.	2.235	2.309	2.281	2.26	2.39
2.	2.245	2.389	2.265	2.336	2.37
3.	2.174	2.194	2.086	2.04	2.086

Beckurts has also examined other drugs, such as Hydrastis canadensis, cinchona bark, and the leaves and roots of aconite.

From these he deduced that with the exception of hyoscyamus herb and conium herb the results yielded by Keller's process were satisfactory, and showed a gratifying degree of uniformity as compared with the results obtained by other methods.

The Valuation of Drugs.—C. C. Keller gives the following general direction for the assay of the more important drugs. The general method for assay is the following :

The drugs must be dry and in a finely pulverized condition. The

drying should not be conducted at high temperatures, but preferable in a desiccator over quicklime or sulphuric acid. The powder must be fine enough to pass through an 80-mesh sieve. According to the percentage of alkaloid, use from 10.0 to 20.0 Gm. of the dry powder for the assay, or 12 to 25 Gm. in the medical condition. The extraction is conducted in a cylindrical percolator of 200 to 300 C.c. capacity, so as to enable thorough exhaustion of the drug. For the solvent, pure ether or a mixture of 75 to 80 per cent. ether and 25 to 20 per cent. chloroform, may be used. It generally suffices to macerate the drug five to ten minutes with the solvent, shaking the mixture occasionally before adding the alkali. In some cases it may be necessary to first remove the fatty matter from the drug by extracting the same in an exhaustion tube, or an ordinary funnel. In the latter case place a plug of cotton in the stem of the funnel, then pack in quite firmly the drug, and extract the fat by means of ether. Should the latter take up any alkaloid, as is frequently the case, the alkaloid must be recovered by washing out the fatty ether solution with acidulated water.

The Alkali.—For the alkali a ten per cent. ammonia solution is generally used. Immediately upon the addition of the alkali the mixture must be vigorously shaken so that the drug powder may be moistened uniformly. Continue the maceration for about half an hour, during which shake the mixture occasionally. Now add a definite quantity of water, which varies for different drugs and must be determined by experiment. After thoroughly shaking the mixture the drug mass will gather in lumps and thus permit the ether to be poured off as a clear solution.

Recovery of the Alkaloidal Solution.—Occasionally it may be impossible to recover the full quantity of the ethereal solvent prescribed on account of the drug not separating promptly, as with Ipecacuanha, for instance. Yet the full quantity may be recovered if as much as possible of the separated solvent is first poured off, and the closed flask with its remaining contents be then gently shaken in a horizontal position and allowed to remain at rest for a short time. The drug mass will then usually collect in balls and enable the pouring off of the requisite quantity of the ethereal solvent.

In many cases it is advantageous to pour off into a flask a little more than the required quantity of the solvent, as for instance 83 Gm. instead of 80 Gm. or 104 Gm. instead of 100 Gm. The well stoppered flask may then be set aside for some time, after which the requisite quantity, 80 or 100 Gm. of the clear solution is poured into a separatory funnel.

The clearer and purer this solution, the more readily will the liquids separate in the further operations. The ether solution may contain besides alkaloids, fat, wax, resins, coloring matter, odoriferous principles, etc., and must therefore be washed with acidulated water to extract the alkaloid. Usually a solution containing 0.5 to 1.0 per cent. hydrochloric acid is used

for this purpose in quantities of 25, 15 and 10 Cc., hence a total of 50 Cc., for the three extractions. The alkaloids show a difference in behavior, some passing readily and others slowly into the acidulated solution. Three washings, however, suffice for the complete extraction. The acidulated aqueous solutions are again placed in a separatory funnel (heating or filtering is generally not necessary), made alkaline with ammonia and immediately treated with the successive portions of 3 parts by weight of chloroform and 2 parts of ether, or with pure ether. It is best to first add the ethereal solvent to the acid alkaloidal solution, and then the ammonia. Use 100 Gm. of the mixed solvent, or 75 Gm. of ether.

The Nature of the Solvent.—If only ether is used as the solvent, two separatory funnels are required so as to permit the transfer of the aqueous solution from one to the other. As the liquids separate readily, the operation does not take long. The use of ether alone has advantage over the mixed solvent of chloroform and ether, since the alkaloids extracted by the former are generally purer, more colorlesss, usually crystalline, and can be easily dried, whereas the tough residuum recovered on evaporation of the chloroform solutions is difficult to dry completely. Alkaloids which in a crystalline state are insoluble or difficultly soluble in ether, may nevertheless be extracted by means of ether if there is sufficient of the solvent to act upon them in their nascent condition. In such cases there must be no delay in the extraction, or the alkaloid might separate from the solvent by crystallizing. The combined ethereal extracts are set aside for a short time, and then passed through a small filter moistened with ether, and finally distilled.

For Distillation.—For the distillation tared Erlenmeyer flasks of 150 to 200 C.c. capacity are used. The flasks are connected with a suitable condenser, and to avoid accidents it is advisable to first transfer to the tared flask only 30 to 40 C.c. of the solvent, and distil it. The separated alkaloid facilitates the distillation of the remaining portions to be subsequently distilled. The residuum from the distillations is treated with two or three small portions of ether, and the latter removed by heating the flask on a water-bath. The vapors of ether are finally removed from the flask by means of a current of air from a bellows, and the flask and contents heated on the water-bath for periods of 15 minutes each, and weighed in the intervals.

The Titration.—For the titration the alkaloids are dissolved in 5 to 10 C.c. of neutral absolute alcohol, water added to the beginning of a turbidity, and the titration performed with $\frac{N}{10}$ or $\frac{N}{20}$ hydrochloric acid solution, using hæmatoxylin for indicator. The above method of Keller possesses certain advantages over others heretofore known, inasmuch as it does not require any complicated apparatus, may be completed in the course of a few hours, and yields the alkaloids in an unusually pure

condition. Aconitine, veratrine, atropine, strychnine, brucine, etc., are recovered colorless or pure white, and soluble in dilute acids, leaving but an insignificant residue. This result is attributed principally to not using alcohol in the preliminary extraction.

The Temperature.—The alkali and acid is permitted to act upon the alkaloids only at the ordinary temperature, and for so short a time that change in the alkaloids is not to be feared. The above outlined method serves as the basis for all subsequent dissections in which the proportions of chemicals, etc., are more particularly given.—Schweiz. Wochenschr. f. Chem. and Pharm., 1894, Nos. 5, 6, 7, 12 and 13; Amer. Drug. and Pharm. Rec., 1894, 54.

Aconitine—Determination of.—John C. Umney describes the process as follows: A definite weight of alkaloid or total alkaloidal residue is completely hydrolyzed by heating on a water-bath for two hours, in a flask fitted with a reflux condenser, with a certain volume of alcoholic solution of a caustic alkali. The acetic and benzoic acids thus produced combine with the alkali present, the amount which has entered into combination being determined by difference by titration of the uncombined alkali with a volumetric solution of acid. The solution after titration is again made markedly alkaline, and the alcohol dissipated on a water-bath. To this is then added sufficient excess of hydrochloric acid to liberate the whole of the benzoic acid, which is removed by successive washings with ether. The benzoic acid is then weighed, and the amount of solution of alkali which was required for its neutralization in the first part of the process calculated. On deducting this amount from that of the total alkali required for neutralization of the acetic and benzoic acids formed by hydrolysis. The amount required for neutralizing the acetic acid formed, and thus the amount of crystalline aconitine present, is determined. It may be observed, however, that calculating from either of the two formulæ put forward for aconitine, and at present, under discussion, the amount of acetic acid produced by hydrolysis is practically identical, viz.: 9.30 and 9.27 per cent. respectively, and final acceptance of either as correct will only affect in the slightest degree the determination of aconitine by this process.—Pharm. Jour. Trans., 1895, 860.

Aconite Root Determination.—C. C. Keller (for general directions see Valuation of Drugs, by C. C. Keller) gives the following:

Formula A.	Aconite Root (80 powd.)	12.0 Gm.
	Ether	90.0 Gm.
	Chloroform	30.0 Gm.
	Ammonia	10.0 Gm.
	Water	20.0 Gm.
	Pour off	100.0 Gm.

Formula B.	Aconite Root	25.0 Gm.
	Ether	100.0 Gm.
	Chloroform	25.0 Gm.
	Ammonia	10.0 Gm.
	Water	30.0 Gm.
	Pour off	100.0 Gm.

Extract with hydrochloric acid, eventually with chloroform-ether, or better, with pure ether. According to Hager the tubers contain 0.6 to 1.25 per cent. aconitine. Jurgens found but 0.2 per cent. The author found 5 samples to contain respectively 0.87 per cent., 1.14 per cent., 1.05 per cent., 1.23 per cent., and 0.97 per cent. of the alkaloid.

The alkaloid is recovered as a colorless residue, but after several treatments with ether it becomes a foamy, partly crystalline mass, in which form it may be recovered directly if ether is used for the solvent. It is easily and completely soluble in alcohol, the solution becoming turbid on the addition of water, and is easily titrated with tenth or twentieth normal acid solution. One C.c. of tenth normal hydrochloric acid represents 0.0647 alkaloid in the titration. Although the alkaloid obtained is a mixture, it is no doubt principally aconitine.

The pure crystalline aconitine may easily be separated from the amorphous bases. After the alkaloids have stood 24 to 48 hours, they are washed with repeated small portions of cold ether, by which the amorphous bases are dissolved, leaving the aconitine as a pure white crystalline powder. If the solution of the amorphous bases is evaporated, a further amount of crystalline aconitine may be recovered. From a mass of 0.282 Gm. crude alkaloid, 0.239 Gm. crystalline aconitine, and 0.043 Gm. of amorphous alkaloid were obtained.

Under the microscope the crystals appear as colorless rhombic plates, exhibiting the property of double refraction to polarized light, and give a beautiful play of colors.

While the production of crystalline aconitine has been difficult, the opportunity is now given every pharmacist to make his own *aconitinum purum crystallisatum* by the above process.

If the crude alkaloid be dissolved in about 10 C.c. of alcohol, sufficient water added to cause a turbidity, and the latter just made to disappear by the further addition of the requisite quantity of alcohol, the aconitine may be recovered on spontaneous evaporation of the solution as colorless prismatic crystalline needles. The alkaloid appears to undergo some decomposition during the long standing, as the amount recoverable is considerably reduced.

If a little of the crude alkaloid be treated with some official phosphoric acid and the solution evaporated, a pale pink color with a violet tinge is developed. The pure crystalline aconitine develops no color. The amorphous alkaloids treated as above develop an intense brownish-violet

color. The reactions with sulphuric acid show the same variation, and indicate that the color reactions of aconitine are not due to the latter, but to its impurities.—Amer. Drug. and Pharm. Rec., 1894, 96; from Schweiz. Wochenschr. f. Pharm., 1894.

Aconite Leaves Assay.—C. C. Keller (Ibid.) gives the following:

Aconite Leaves (No. 80 powd.)	25.0 Gm.
Ether	100.0 Gm.
Chloroform	25.0 Gm.
Ammonia	10.0 Gm.
Water	50.0 Gm.
Pour off	100.0 Gm.

Extract with hydrochloric acid, and finally with chloroform-ether. Decant about 105.0 Gm. of the deep green solution, allow it to settle for a few minutes, then transfer 100.0 Gm. of it into a separating funnel. The alkaloid is recovered as light yellow coating. From commercial powdered aconite leaves of good appearance Keller obtained only 0.18 to 0.20 Gm. of alkaloid. Swiss leaves contained 0.21 per cent. The alkaloid from the leaves appears to be different from that obtained from the tubers, requiring apparently less normal acid for neutralization. The equivalent for the alkaloid from the tubers is 645 to 647, while that of the leaves is but 440 to 450. The titration is best performed with $\frac{N}{20}$ acid upon a concentrated solution of the alkaloids.

Belladonna Root Assay.—C. C. Keller (Ibid.) employs the following:

Belladonna Root (No. 80 powd.)	12.0 Gm.
Ether	90.0 Gm.
Chloroform	30.0 Gm.
Ammonia	10.0 Gm.
Water	15.0 Gm.
Pour off	100.0 Gm.

Extract with hydrochloric acid and finally with chloroform ether. The atropine is recovered in a very pure condition, as an almost colorless coating, which becomes partly crystalline on repeated treatment with ether. It is soluble in alcohol to a colorless solution and is easily titrated. 1 C.c. of $\frac{N}{10}$ acid represents 0.0289 Gm. of atropine. The results by weighing agree closely with those of the titrations. Keller found 0.66–0.67 per cent. of atropine in a belladonna root.

Belladonna Leaves Assay.—C. C. Keller (Ibid.) employs the following:

Belladonna Leaves (No. 80 powd.)	25.0 Gm.
Ether	100.0 Gm.
Chloroform	25.0 Gm.
Ammonia	10.0 Gm.
Water	40.0 Gm.
Pour off	100.0 Gm.

Extract with hydrochloric acid and finally with chloroform ether. The atropine from the leaves presents the same properties as that from the root. Keller found 0.38–0.40 per cent. of atropine in the leaves.

Assay of "Cortex Granati."—W. Stoeder.—Gehe has stated that cortex granati contains about 0.3 per cent. of alkaloids. The author, however, has generally found 1 per cent., but in the root bark only, the other varieties yielding much less. Gehe's process of extracting the bark with a mixture of ether, chloroform and ammonia, dissolving the crude alkaloids in excess of standard sulphuric acid, and titrating back with an alkali, is, however, quite trustworthy.—Chem. Centr., 1894, 606; Jour. Chem. Soc., 1894, 491.

Assay of Ergot.—C. C. Keller (Schweiz. Wochenschr. f. Chem. u. Pharm., 1894; Amer. Drug. and Pharm. Rec., 1894, 97) gives the following: To estimate the alkaloid take 25.0 Gm. of dry ergot of about No. 60 fineness, pack lightly into an extraction tube, and exhaust with petroleum ether until a few drops of the latter leave no further residue after evaporation on a watch crystal. Allow the petroleum ether to run off and dry the powdered drug at a gentle heat. Transfer it to a tared cylinder of 250 C.c. capacity, add 100.0 Gm. of ether, and after ten minutes add some magnesia milk. (10 Gm. MgO in 20.0 C.c. water.) Thoroughly shake the mixture, whereby the ergot will collect in lumps and the solution separate clear.

Repeat the shaking frequently during a half hour, after which pour off 80.0 Gm. of the ether solution or a less quantity, according to the amount obtainable, and make the necessary calculation as to quantity, 4.0 Gm. representing 1.0 Gm. of drug taken.

If the solution is not entirely clear let it stand for some time. Pour off the solution from any sediment and extract the ether solution with dilute hydrochloric acid (0.5 per cent.), using successively 25, 15 and 10 C.c. for the purpose. It is well to wash out with another 10 C.c. of the acid and test the latter solution with Mayer's solution for traces of alkaloid. If a turbidity results, the washing with acid must be repeated.

The aqueous acid solution is usually slightly turbid. Any pronounced turbidity may be removed by filtration through wet filter, or by adding a little pulverized talc to the solution and filtering again, and washing the filter with a little water. The acid solution is then shaken with an equal volume of ether after adding an excess of ammonia.

Repeat the extraction with two smaller quantities of ether. Combine the ether extracts, filter the same to remove drops of water, and distil the solution from a tared flask on a water bath. Treat the residuums twice with a little ether, boiling off the ether, and then dry the flask, etc., to constant weight.

For dissolving the alkaloid from ergot ether is preferable to other sol-

vents, giving the purest alkaloid and separating more readily from the solution. Chloroform makes too strong an emulsion to be of any avail, although it is the best solvent. Acetic ether is also unsuited. A mixture of chloroform and ether shows no advantage over ether as a solvent. By the above method the alkaloid is recovered as white or slightly yellowish colored crystals. Petroleum ether does not dissolve any appreciable amount of alkaloid in the preliminary treatment. According to Keller there exists but one alkaloid in ergot, and the author considers Tanret's ergotinine and Kobert's cornutine as one and the same substance.

Character of the Alkaloid.—The picrosclerotine of Dragendorff and Blumberg are, no doubt, identical with the alkaloid obtained by the above method. The alkaloid possesses the following properties: When it has assumed the crystalline form it is difficultly soluble in ether, but readily soluble in chloroform and alcohol. It is insoluble in water, and is therefore precipitated on adding water to the alcoholic solution. It is insoluble in petroleum ether. The latter will precipitate the alkaloid in flakes from its solution in ether. The dilute alcohol solution shows a strong bluish violet fluorescence, which is more conspicuous after acidulation. The fluorescence is best observed by looking down into a test tube filled with the solution and having the upper third surrounded by the palm of the hand. Keller could not observe any green or red coloration on exposure of the solution to the atmosphere, nor did the fluorescence change in intensity.

The alcoholic solution rendered slightly turbid by the addition of water has a slightly bitter taste. The alkaloid forms neutral salts, which may be easily prepared by dissolving the alkaloid in chloroform, diluting with ether, and then adding an ether solution of the acid. The salt formed being insoluble in the ether, is precipitated and may be collected on a filter and washed free from acid by means of ether. Strong daylight should be avoided during the operation. Thus the hydrochloride, tartrate and citrate were prepared. The neutral salts are readily soluble in water, difficultly soluble in dilute hydrochloric acid, so much so that a not too dilute solution of the hydrochloride is almost immediately precipitated on the addition of hydrochloric acid. The acetate and citrate acted similarly.

From the neutral or slightly acid solution chloroform extracts the alkaloid, especially at a temperature of 50° C. Ether extracts but little alkaloid from the acid solution. The aqueous solution of the hydrochloride (1 : 1000) is precipitable by the hydroxides of ammonium, potassium, sodium and barium; the precipitate dissolving readily in an excess of the last three reagents, but not in ammonia. The neutral solution of the above concentration is precipitated by all known alkaloidal reagents.

The assertion of Kobert that cornutine is precipitated by mercuric chloride from solution made alkaline by barium hydroxide, could not be verified, as the latter decomposes and precipitates the mercuric chloride. The alkaloid solution 1 : 5000 is immediately, or after a short time, precipi-

tated by picric acid, iodo-potassium iodide, bromine water, tannic acid and potassium ferricyanide. Mayer's Reagent still gives a precipitate in dilutions of 1 : 10000, and in dilutions of 1 : 20000 a strong opalescence is perceptible.

Color Reactions of the Alkaloid.—Concentrated sulphuric acid poured over a few milligrams of the alkaloid contained in a watch crystal becomes at first slightly yellowish colored. The purer the alkaloid the brighter the color. After a few hours the color of this solution becomes gradually violet blue, the latter being quite permanent. This reaction has been known for a long time, having been applied by Tanret for ergotinine, and by Blumberg for picrosclerotine. Cornutine also gives the reaction, which the author regards as proof of the identity of the three substances. It is of interest to note that the crude crystalline alkaloid as obtained by the assay process, when treated repeatedly with cold ether, leaves a difficultly soluble residue which, according to Kobert's views, would have to consist of cornutine, but nevertheless gives the color reaction exceptionally clear and distinct.

The solution of the alkaloid in concentrated sulphuric acid does not give any definite color reactions with potassium bichromate, potassium permanganate, potassium nitrate, or potassium ferricyanide. With ferric chloride, however, it gives a sensitive and characteristic reaction. Dissolve a few milligrams of the alkaloid in concentrated sulphuric acid, after which add a small drop of ferric chloride solution. On stirring the mass an intense orange-red color, is developed, which soon passes into a deeper red, while the edge zone assumes a bluish to bluish-green color. According to the relative proportions of alkaloid and reagent, the further progress of change in colors is variable, but the orange-red and the bluish to bluish-green outer zone are always developed, and are to a high degree characteristic of the alkaloid.

The Yield from Commercial Samples.—"Cornutinum hydrochloricum Koberti," dark-brown hygroscopic leaflets, soluble in water, and "Ergotinum amorphum," a reddish-white powder, completely soluble in chloroform, were examined by the author with the result that it appears that these two alkaloids are identical with the alkaloid obtained by the Keller process from ergot. Similarity of physiological action gave further proof of the conclusion. Six different commercial samples of ergot of rye yielded, respectively, 0.095 per cent., 0.130, 0.157, 0.205, 0.245, and 0.225 per cent. of alkaloid. The Russian sample was found to be the best, while the Swiss sample, in which particular care had been taken in its collection, and hence supposedly the best, was found to yield the lowest percentage of alkaloid. The crude alkaloid in each case gave the same chemical reactions, with the exception of a Spanish sample, which, on treatment with conc. sulphuric acid, gave a transient green color, but in other respects acted like the others. A sample of ergot, which had been kept in a pul-

verized condition, was still found to yield 0.165 per cent. of alkaloid. Keller emphasizes the statement of Koster (1885), that old ergot may be distinguished from the fresh by the color of the ether extract, the former yielding a dark-brown, the latter a bright-yellowish solution. Keller's investigation of ergot may be summarized as follows:

1. Ergot contains as the active principle only *one* alkaloid. Picrosclerotine, ergotinine, and cornutine are identical.

2. The alkaloid of ergot is a much more stable compound than has been supposed. In a properly-packed pulverized ergot it will keep undecomcomposed for at least a year.

3. The fresh ergot contains the alkaloid in variable quantity, making its quantitative estimation desirable.

Assay of Narcotic Extracts.—L. von Ittalie publishes the following modification of his method of assaying narcotic extracts: 3 Gm. of extract are dissolved in 20 C.c. of water with the aid of 3 drops of dilute sulphuric acid (1 : 6); to this 10 C.c. of acetate of lead solution (1 : 10) is added, and after allowing the precipitate to settle 16 C.c. is filtered off. To this 40 C.c. of a mixture of 75 Gm. of ether and 25 Gm. of chloroform are added, together with 4 C.c. of solution of ammonia. The whole is well shaken for one minute, the ether-chloroform layer made up to its original volume, and again shaken for one minute. 25 C.c. of the ether-chloroform layer is then separated, evaporated, and the alkaloid determined volumetrically. In a mixture containing 0.855 per cent. of alkaloid, this method indicated 0.818 per cent., whilst Dieterich's process showed 0.8185 per cent.—Pharm. Post., 1895, 236.

Alkaloidal Determinations in Narcotic Extracts.—E. Dieterich has compared his ether-lime method with that of Schweissinger and that of Ledden-Hulsebosch in the examination of extracts of aconite, belladonna, hyoscyamus and strychnine, and by the ether-lime method the results are uniformly higher. For extracts, chlorophyll containing the method of Schweissinger-Sarnow is the best; the perforation method may be used if the chlorophyll is first removed. The ether-lime method is not applicable here. In the examination of ipecac, the author observed higher results with the gravimetric method than with titration method of Keller. —Pharm. Centralh., 1895, 163.

Methods for Determination of Alkaloids.—Dieterich has compared the three following methods for the determination of alkaloid in narcotic extracts and powerful drugs, viz., the Schweissinger-Sarnow method by shaking out, Van Ledden-Hulsebosch by the perforation method, and the Helfenberg ether-lime method. His results show a perceptible and regular low percentage by the Van Ledden-Hulsebosch, whilst the ether-lime method shows usually slightly higher figures than the Schweissinger-Sarnow method. The latter he considers sufficiently accurate for practical pur-

poses, and very easy to perform. For general accuracy he recommends the ether-lime process, to which, however, there are some exceptions, as, for instance, ipecacuanha, for which he considers it unsuited. For titration, porcelain basins should be used in the place of glass beakers, using from one to three drops of solution of hæmatoxylin as indicator. For ipecacuanha, Keller's method yields good results.—Oester. Pharm. Zeitschr., xlix., 242.

Assay of Formaldehyde Solutions. — Brochet and Cambier show that the addition of formic aldehyde to a solution of hydroxylamine hydrochlorate results in the total decomposition of the salt into formaldoxime, hydrochloric acid and water, as represented by the following equation: $NH_2OH.HCl + CH_2O = CH_2 : N.OH + H_2O + HCl$. Under certain conditions tri-oximido-methylene $(CH_2 : N.OH)_3$, a triple polymer of formaldoxime is formed. It is stated that by employing an excess of a solution of hydroxylamine hydrochlorate of known strength and subsequently titrating the acid liberated, a good method is afforded of indirectly determining the strength of solutions of formic aldehyde. The end reaction is clearly indicated by means of methyl-orange. Monomethylamine hydrochlorate acted upon by formic aldehyde is also shown to be converted into trimethylene-triamine.—Compt. rend., cxx., 449.

Quantitative Estimation of the Constituents of Frangula and Cascara.— V. Schmelik (Nordisk Tidskrift, March, 1895) takes 10 Gm. of the Fld. Ext. of Frangula and evaporates the same in a porcelain-dish to 3 Gm. To this residue 10 C.c. of 95 per cent. alcohol are added, filtered and 10 C.c. of alcohol added in the same manner 3 times. The alcohol from the filtrates is put together, evaporated, and the residue is dissolved in water, acidified with dilute HCl and shaken out with chloroform. This is repeated 3 times. The chloroform is removed by distillation and the crystalline residue is taken up with NaOH and diluted with warm water, and the coloration compared to a solution containing 0.01 gm. emodin in 500 C.c. In Cascara Sagrada the same procedure is followed as above, but the residue prior to shaking out with chloroform is made alkaline with NaOH and then after the addition of chloroform is acidified with HCl gradually. The same procedure follows then as with Frangula.—Pharm. Centralh., 1895, 368.

Assay of Hydrastis.—C. C. Keller (Schweiz. Wochenschr. f. Pharm. u. Chem., 1894; Amer. Drug. and Pharm. Rec., 1894, 55) gives the following:

Formula A.	Hydrastis (60 to 80 powder)	12.0 Gm.
	Ether	120.0 Gm.
	Ammonia	10.0 Gm.
	Water	15.0 Gm.
	Pour off	100.0 Gm.

Formula B.	Hydrastis (60 to 80 powder)	25.0 Gm.
	Ether	125.0 Gm.
	Ammonia	10.0 Gm.
	Water	30.0 Gm.
	Pour off	100.0 Gm.

Extract with hydrochloric acid and eventually with ether, or chloroform ether.

Of the three alkaloids, berberine, hydrastine and canadine, the hydrastine is considered as representing the medicinal value of the rhizome, and hence the reactions of the German Pharmacopœia and the third edition of the Swiss Pharmacopœia for rhizome. Hydrastis and fluid extract of hydrastis, which depend upon the berberine, do not indicate the medicinal values of the drug, or its contents in hydrastine. If the assay is conducted according to Formula A, the hydrastine is obtained from 10.0 Gm. of the drug; if according to formula B, from 20 Gm. of the drug.

With chloroform-ether solvent, the hydrastine is recovered as a yellow mass very difficult to dry, while from the ether solutions it separates in the form of yellowish white crystals. In spite of the yellow color the alkaloid contains but little berberine. Keller found the percentage of hydrastine to range from 2.63 to 2.97 per cent.

The alkaline reaction of hydrastine is so indefinite that it cannot be readily titrated. However, it may readily be obtained in well-defined crystals by dissolving in 8 C.c. of warm alcohol, adding 4 C.c. of ether and gradually 20 C.c. of water, and setting the mixture in a cool place to crystallize. After 24 hours the hydrastine will be found separated as slightly yellowish colored needles. The mother liquor is poured off through a filter and 6 C.c. of cold water used for washing and rinsing the flask and filter. After drying both at 100° C., remove the crystals to the flask and weigh.

Ipecac Assay.—B. H. Paul and A. J. Cownley (Pharm. Jour. Trans., 1894, 111) gives an historical account of the alkaloidal investigation of this drug. Their experiments, containing the work on it, lead them to say that what has hitherto been known as emetine is a mixture of two or more alkaloids. The two which they have separated they name emetine and cephaeline. These are separated by caustic alkali, in which the emetine is insoluble. The cephaeline, which is soluble in caustic alkali, forms uncrystallizable salts, but can itself be obtained in a crystalline state from an ether solution. The emetine seems to be uncrystallizable, but its halogen salts and nitrate can be crystallized. Both are colorless, or nearly so. In another paper in the same journal, November 10th, the principal poiut is a negative answer to the query, Is an acid salt of the base formed when ready crystallization takes place in solutions of each base with excess of hydrochloric acid?

Leaflets and Leaf Stalks of Jaborandi.—M. Conroy (Amer. Drug. and Pharm. Rec., 1895, 307). Jaborandi as imported consists of leaflets and leaf stalks, and as the stalks constitute no inconsiderable portion of the bulk, it was thought desirable to ascertain what alkaloidal value they possessed. Consequently a selection of leaflets and leaf stalks was made from the same bale for analysis. These were ground into No. 40 powder and exhausted by percolation with proof spirit containing 0.5 per cent. of hydrochloric acid. The percolates were evaporated to soft extracts. The yield of extracts, calculated as dried at 212° F., was, from the leaflets, 22.35 per cent., and from the stalks 20.3 per cent. The quantity of alkaloid was determined by taking a quantity of each of the extracts equal to 100 grains of the leaflets and stalks, and proceeding as follows:

The extract was dissolved in half a fluid ounce of water, and well shaken up with two successive quantities of chloroform to remove chlorophyll, etc. The aqueous solution was then rendered alkaline by adding solution of sodium carbonate, and the alkaloid washed out by chloroform in the usual way. From this the alkaloid was removed by dilute hydrochloric acid, and the chloroform treatment repeated, which gave the alkaloid in a very pure state.

The yield of alkaloid from the leaflets was 0.76 per cent., and from the stalks 0.37 per cent. From this it will be seen that the alkaloidal value of the stalks is practically one-half that of the leaflets.

Estimation of Nicotine in Tobacco.—G. Hent.—Having reviewed the methods which have been suggested for the estimation of nicotine in tobacco, the author concludes that Kissling's method is the most generally applicable. By adopting Pezzolata's method for separating nicotine and ammonia, he has proved that when anhydrous ether is employed in Kissling's method, a distillate which is free from ammonia is obtained. Pezzolata's suggestion that magnesia should be used as the base for the liberation of the nicotine was found to be valueless in the author's hands. It is pointed out that not only does ammonium sulphate partially dissociate during the evaporation in Pezzolata's method, but also the nicotine sulphate. Acid nicotine sulphate is, however, free from this fault, so that care must be taken that the base is converted into the acid salt.—Arch. der Pharm., 1894, 658.

Opium Assay Method of the New Pharmacopœia.—F. X. Moerk has made an examination and reports (Amer. Jour. Pharm., 1894, 445) as follows: From the results will be seen the necessity for the following suggestions, embracing corrections and original investigations for the perfection of the official process:

(1) A test for the purity of the weighed morphine.

(2) Information as to the necessary time for the maximum precipitation of morphine.

(3) Information as to the quantity of morphine left in the mother-liquor.

(4) Information as to the nature of the second precipitation (which Dr. Squibb states is probably meconate of calcium), and its effects, if any, upon the yield of morphine, if the assay be allowed to stand until no further precipitation takes place.

(5) Information as to the error involved by the solubility of the morphine impurities in the lime-water test for the purity of morphine.

The following remarks may be of assistance in following up this matter:

(2), (3) and (4) will be helped along by collecting the ethereal solutions, the mother-liquors, and the several washings in separate containers. To solve (3) the mother-liquor and the aqueous washings must be taken together, freed from precipitate (which is to be examined separately for morphine), and then shaken out with two portions of chloroform of 30 C.c. each, as first carried out by Dieterich (in Dieterich's process alcohol was added to the mother-liquor to make about a 20 per cent. alcohol solution before shaking with chloroform); the chloroform solution is evaporated to dryness, the residue dissolved in 2 C.c. $\frac{N}{1}$ sulphuric acid, adding 3 C.c. water and 2 C.c. $\frac{N}{1}$ ammonia, filtering, washing the filter and precipitating with a little water, mixing the filtrate and washings with 2 Gm. ether and 0.5 C.c. $\frac{N}{1}$ ammonia, and setting aside for twenty-four hours to allow the crystallization of the morphine; by this method he claims to ascertain the entire quantity of morphine left in the mother-liquor, varying from 0.2–0.65 per cent.

(5) can very likely be solved by collecting the precipitates occurring in the mother-liquor and aqueous washing, drying, taking a definite weight (0.5 Gm.) and putting it through the lime-water test; the difference in weight before and after will indicate the quantity going into solution; as a control experiment this purified precipitate can be tested a second time by solution in lime-water.

Determination of Morphine in Opium.—E. Dieterich (Pharm. Centralh., 1894, 21) has obtained better results by his titration method than by means of either Flückiger's method or Flückiger-Schacherl method. His method consists in obtaining the morphine as in his method (Helfenberger Annalen, 1890, 66; Pharm. Centralh., 1890, 597), drying at 100° C, dissolve in 50 C.c. $\frac{N}{20}H_2SO_4$ (warm); making up to 100 C.c. Titrating twice (using $\frac{N}{20}KOH$) with 40 C.c. each time of solution and adding to the solution 5 drops of hæmatoxylin solution (1 : 100). Multiply the number of C.c. H_2SO_4 required by 0.947 for obtaining the percentage of morphine (containing water) in the opium or by 0.89 for the dry morphine. —Pharm. Centralh., 1895, 21.

Assay of Sabadilla—C. C. Keller (Schweiz. Wochenschr. f. Pharm. u. Chem., 1894; Amer. Drug. and Pharm. Rec., 1894, 96) gives the following:

Sabadilla (80 powd.)	15.0 Gm.
Ether	150.0 Gm.
Ammonia	10.0 Gr.
Water	30.0 Gr.
Pour off	100.0 Gm.

Extract with hydrochloric acid and eventually with ether. Sabadilla seeds contain considerable fat, which, however, does not hinder the assay.

Pour the ether over the drug contained in a 300 C.c. flask, macerate for about one hour, add the ammonia, and after another hour the water. After shaking the mixture vigorously set it aside for one or two hours, after which with due care 100.0 Gm. of the alkaloid solution may be poured off clear. The alkaloids after two or three treatments with ether are recovered as a white and partly crystalline mass, almost completely soluble to a colorless solution.

Keller found 4.25 to 4.35 per cent. of alkaloid, while the quantity reported by various authorities is given at 1 to 2 per cent.

The alkaloids represent a mixture which beside veratrine and veratroidine contains sabadilline, sabatrine, and some other alkaloids occurring only in very small quantity (Merck's sabadine and sabadinine). Little is known as to the proportions of the different alkaloids. Owing to the alkalinity and clear solution the alkaloids are easily titrated. Keller found for the purified alkaloid the equivalent 620 to 630, so that one C.c. of decinormal hydrochloric acid solution represents 0.0625 Gm. of alkaloid.

ACETA.

Vinegar of Squills.—F. W. Haussman (Amer. Jour. Pharm., 1895, 85) says: Considerable variation appears to exist in the color of this preparation. As usually found in the United States, it is yellow, due to the employment of the white variety of the drug in its preparation. Occasionally, however, we find the red variety of squill in our market, and this is especially the case with the ground drug. Vinegar of squill made from this variety is red-brown, appears to have a more pronouncedly bitter taste, which it will communicate to the syrup made therefrom, and which will also have a similar color. As the syrup is a frequently sold article, the altered taste and color is at times regarded with suspicion by the consumer. Having occasion to examine a number of samples of the vinegar, the writer noticed in several the odor of acetic ether. Further examination revealed also the presence of alcohol. Such vinegars mostly had a cloudy appearance, and a sample prepared by the writer from the fluid extract, according to the formula of a certain manufacturing firm, possessed the identical properties after standing, both in odor and appearance. Fluid extract of squill, a preparation largely alcoholic, appears to have been used in the preparation of these vinegars, and consequently the alcohol and acetic acid entered into combination to form acetic ether. On

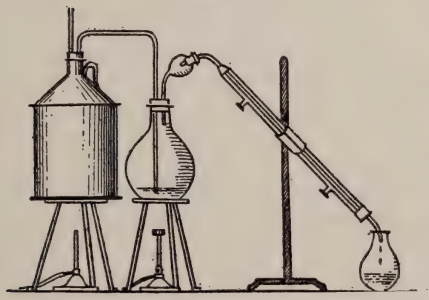
heating the vinegar, the latter is dissipated, together with the excess of alcohol, hence the odor of the ether is not so prominently noticeable in the syrup made by heat. The practice of "easy preparation" of this official vinegar should be discouraged. It is not only a flagrant disregard of the Pharmacopœia, but a preparation of this kind will, by its odor, reveal the professional principle of its maker.

AQUÆ.

Preparation of Small Quantities of Aromatic Waters.—C. E. Sage. The apparatus required consists of (1) a ½-gallon tin can; (2) a 36 or 40 ounce flask and (3) a condenser. The accompanying diagram shows the manner in which these are connected together. The can and flask are each fitted with corks pierced with two holes. The cork in the can is traversed by a long piece of tubing reaching to the bottom of the can and protruding about a foot above, to act as a safety valve; from the other hole in the top of the can a piece of glass tubing bent twice at right angles passes to the bottom of the flask; by this means the steam is conveyed from the tin to the flask, and, rising, it finds an outlet by passing into the condenser.

The can is filled three parts full with water and heated to boiling; the drug to be used for preparing the water is placed in the flask, the connecting glass tube thrust to the bottom, and the application of heat to the can

FIG. 57.



Simple Apparatus for Making Aromatic Waters.

continued. The steam saturates the drug and carries over all the volatile matter with it to the condenser. When steam has been passing for some time, the drug in the flask is transformed into a thin paste by the water which has condensed therein, and spurting and splashing begins if it is not remedied. The object of the globe tube in the top of the flask is to trap any of these splashes and only allow the vapor to pass into the condenser. To prevent a large amount of liquid condensing in the flask, several means may be employed: either the flask may be surrounded with hot water, or a Bunsen with a rose burner may be placed underneath. Care, however, must be taken to turn the flame down low if the latter method is employed, or the drug will soon get scorched.

The flask may be substituted by a wide-mouthed jar or a metal tube, but a great improvement is made by placing a piece of gauze about an inch from the bottom and placing the drug on the gauze; the steam then passes more evenly through it. Using a can of the size above mentioned, it is possible to distil about a pint of water an hour.

In many instances the waters produced by distilling a drug with water possess a peculiar odor, which, to a great extent, passes off in time. This is due to volatile organic matter, other than oil, contained in the drug, and its presence does not improve the keeping properties of the waters. This has led the author to substitute the essential oil instead of the drug, in other instances besides that of peppermint, and he finds the product much more satisfactory, both as regards keeping properties and aroma. A much smaller flask in this case suffices.—Pharm. Jour. Trans., 1895, 786; Chem. and Drug., 1895, 340.

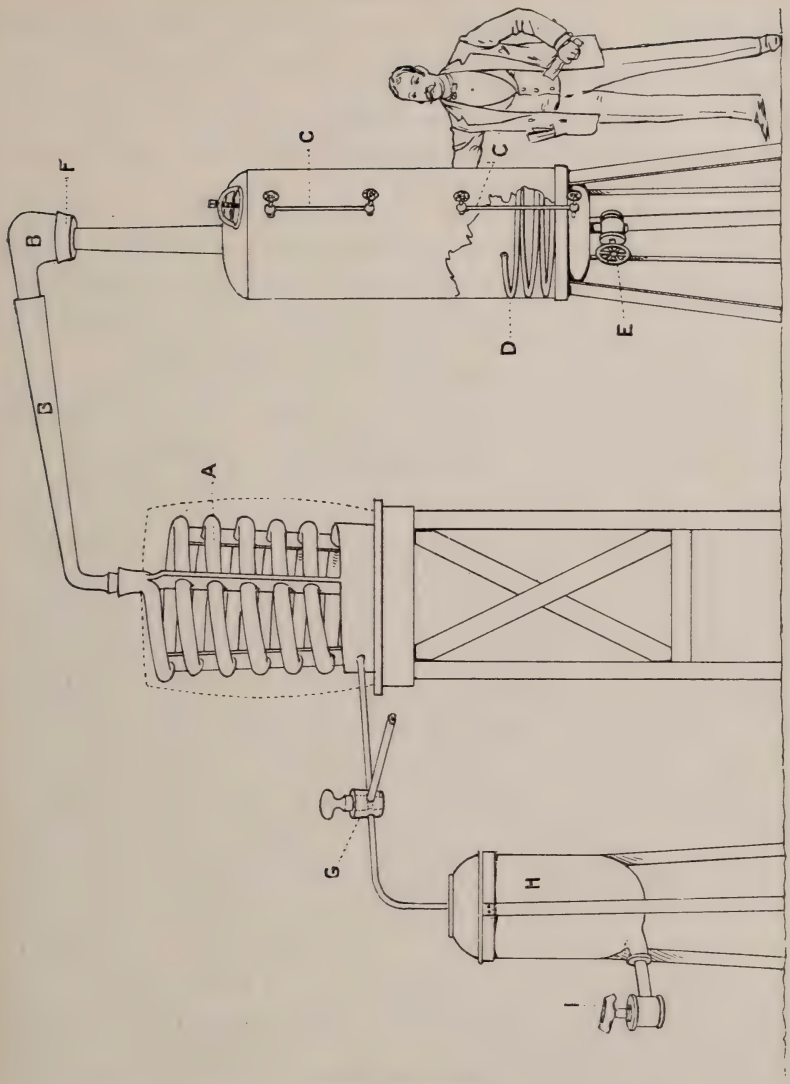
Vegetations in Old Distilled Waters (Alcoholic).—Barnouvin says that the labors of Pasteur have shown that vegetable moulds take on the character of ferments only when they are deprived of air, or have an insufficient supply thereof, a fact which also accounts for the presence of such moulds in alcoholic distilled waters. The author found in peppermint water a mould which secreted a yellow coloring matter that was not altered either by sulphuric or hydrochloric acid, or by alkalies, and, therefore, answered to the micrococcus luteus of Cöhn. In another he found the micrococcus aurantius, Cöhn, the coloring matter of which is soluble. Linden water sometimes takes on a rosy-red color, due to the presence of micrococcus prodigiosus. The author observed colonies of algæ (microhaloa firma, palmella firma) in linden-flower water, and in matico water colonies of protococcus chlamidomonas.—Nat. Drug., 1895, 48.

Aqua Chloroformi.—W. Elborne contributes a process for making aq. chlorof. depending on the osmosis of chloroform through parchment paper. The chloroform contained in parchment paper is suspended in the water. If 1 drachm of chloroform be used and 25 ounces water, eight days are required to saturate the water, but if a large excess of chloroform be used, 24 hours are sufficient. Three parts of the saturated solution equal 4 parts aq. chlorof. P.B. The process is suggested for other medicated waters.—Pharm. Jour. Trans., 1894, 581.

Aqua Destillata.—J. U. Lloyd has found that pharmacopœial distilled water can be made, by means of suitable apparatus, out of impure river water. His attention was directed to the water of the Ohio river, containing clay, sand and organic matter. With the process and apparatus he describes, having clean connections, every portion of the distillate withstood the requirements of the U. S. P. The following is a description of the apparatus employed:

A chemical stoneware worm was made to order by the Doulton Pottery,

FIG. 58.



Aqua Destillata.

DESCRIPTION.

A. Stoneware worm.
B, B. Stoneware head and arm.
C, C. Water gauges.
D. Steam coil for boiling the water.
E. Stop-cock for emptying the still.
F. Copper flange, connecting with stone head.
G. Three-way glass stop-cock.
H. Stoneware receiver.
I. Stoneware stop-cock.

London. It was 1 inch bore and 42 feet in length, all in one piece. To this a stone arm, connected with a stone head, was attached, thus providing that every portion of the surface touched by the condensed water should be of material unaffected by water. The hood referred to sat loosely in a copper flange upon the apex of the lengthened exit of a new copper still. All connections were closed by absorbent cotton, no cement being employed.

The still was constructed of copper, being designed after the plan adapted for the concentration of such extractives as the author does not wish to evaporate to dryness. In this case, instead of the usual false bottom for the steam jacket, a copper coil is thrown three times around the inside of the still, the lower line being one-tenth the space above the bottom of the still. Thus, with an extract or resin it is not necessary to watch the still constantly, for when the liquid contents are evaporated to the lower line of the coil, further evaporation ceases. All danger of injury by caking of the residue through forgetfulness is thereby overcome. The exit of the stone worm, in the present case, was provided with a three-way glass stop-cock, one terminal being attached to a 25-gallon chemical stoneware jar, closed at the top and provided with a stone stop-cock at the bottom. The other terminal of the stop-cock was intended to divert the first portions of the distillate in case continuous distillation was found to be impracticable. This, in general, describes the apparatus—shown in greater detail by the accompanying drawing—the comparison with the figure beside it showing the relative size of the various parts of the device.

First, a charge of 15 or 20 gallons of water was distilled in order to completely cleanse the apparatus. Finally the water passed transparent, colorless and odorless, and was found to conform in every way to the requirements of the Pharmacopœia. By Nessler's test no trace of ammonia could be detected.—Amer. Jour. Pharm., 1895 (April), 190.

Care of Distilled Aromatic Waters.—A writer in the American Druggist (1894) describing his experience with distilled rose-water and orange-flower water, says: "It is perfectly proper to keep them in dark cool places. But unless they are allowed to air occasionally they will smell moldy and have little resemblance to the flowers from which they are made. The writer has now two demijohns of imported rose-water from the well-known house of Schimmel, in Leipsic, Germany. When received and opened they did not smell much like rose-water, but after three or four days' airing they became once more the elegant rose-water that they are. It is my practice to allow them to remain open at least one or two days in a month. It does away entirely with the musty odor and brings out strongly the delicate flavor of the rose. This is true not only of rose-water, but of many others, and distilled water will keep much better in a cool place with a piece of cheese cloth tied over the mouth of the demijohn than if tightly corked. Some years ago the writer had two barrels of

natural spring-water from one of the most popular springs. One was left open with a cloth over the bung to keep the dust out; the other was closed. After lying in the cellar all winter side by side, in the spring the one left open was found in perfect condition, while the other was spoiled." —West. Drug., 1894 (Dec.), 488.

Bitter Almond Water.—E. Utescher says that in a 0.1 per cent. solution, cyanogen combines with benzaldehyde, and that in dilute alcohol solutions the combination is quicker. A solution of 0.1 per cent. cyanogen which contains 25 per cent. official alcohol and 0.5 per cent. alcohol, forms after six or eight days official bitter almond water which cannot be determined differently.—Pharm. Post, 1894, 311.

——— G. Glücksmann in commenting on the official assay says the following is practical: To 50 C.c. of the water add 30 C.c. of NaOH and dilute with 100 C.c. of water and clear the solution if necessary with some alcohol. Then titrate with $AgNO_3$ solution. The per cent. of HCN is obtained by multiplying the number of C.c. of $AgNO_3$ solution used by 0.108.—Ibid., 403.

Cherry Laurel Water.—The variation in the strength of the distilled water of these leaves makes it necessary for an after-standardization. Carles points out, however, that the age and time of year are not the chief factors in this variation, but that as the amygdalin and synaptase exist separately in the cells, the fineness of division of the leaves has a material effect on the strength of the final product. The same sample of leaves will yield a higher percentage of HCN when finely divided and crushed than when in a coarse state of division.—Brit. and Col. Drug., 1894.

Aq. Menthæ.—J. H. Heaf revives the question as to what should be dispensed for aqua menthæ. It was the opinion of the members of the London Chemists' Assistants' Association that "aqua menthæ" should be added as a synonym for "aqua menthæ piperitæ."—Brit. and Col. Drug., 1875, 130.

BOUGIES.

Mass for Medicated Bougies.—Cacao butter, 4 parts; powdered gum acacia, 2 parts. Mix intimately and add, with constant kneading, a mixture of glycerin, 1 part; water, 2 parts. If required, the quantity of cacao butter may be slightly increased.—Pritzker; Rev. Therapeut., Feb., 1895.

COLLODION.

Collodium Cantharidatum.—F. Hemm (Amer. Jour. Pharm., 1894, 393), suggests the following: Exhaust the powdered flies with ether in same kind of percolator as already mentioned, distill off ether from percolate until reduced to 70 parts; add 3 parts of pyroxylin, 5 parts Canada turpentine, 3 parts of castor oil and and 19 parts of alcohol; shake until dissolved and set aside to clear up. The German Pharmacopœia directs

ether as the menstruum, but makes its cantharidal collodion 100 per cent. strong, quite a difference from ours, which is only 60 per cent.

For general use a 60 per cent. preparation gives satisfactory results, but veterinarians report decidedly best results with the 100 per cent. They also prefer it made thicker than the official preparation. It has been suggested to make this preparation by dissolving cantharidin in the proportion of 4 grains to 1,000 grains in flexible collodion.

Depilatory Collodion.—In Bull. Soc. Pharm. de Lyon; Amer. Drug. and Pharm. Rec., 1894, is found the following formula:

Iodine	75 Cgm.
Oil of turpentine	20 drops.
Castor oil	2 Gm.
Alcohol	16 Gm.
Collodion	30 Gm.

Apply once daily for three or four successive days. When it comes off, the spot to which it is applied will be found free of hair.

CONFECTIONES.

Confection of Phosphorus.—Hartz proposes the following formula as yielding a stable and satisfactory preparation: Seven ounces of the best wheat flour, 1 ounce of Armenian bole, and 8 ounces of glycerin, are stirred together in a tin kettle of the capacity of half a gallon. A solution of 4 scruples of salicylic acid and 4 drams of sodium phosphate in 2 fluid ounces of water is added, and then 14 ounces of boiling water are admixed, with constant stirring. The whole is now heated until a thick, uniform paste is formed. Three drams of phosphorus in sticks are then covered with the hot paste, and by rapid but careful stirring the phosphorus is distributed in about three minntes in a manner that no phosphorus granules will any longer be visible to the naked eye. Two ounces of mutton tallow are then introduced, the whole is covered, and when the tallow is melted, again cautiously stirred. The mass is apt to ignite during this last operation unless this be done quickly and with care. Inexperienced persons will, therefore, do well to wrap a cloth around their hands.—Pharm. Rund., 1894., 214.

DECOCTA.

Stable Decoction of Althæa.—The decoction is prepared cold, with the addition of a small quantity of licorice root, allowed to stand for one-half hour, and filtered through paper. The filtrate is filled into small bottles (60–100 Gm.), which are then heated on the water-bath. When the liquid has cooled, the vials are securely corked, the stoppers covered with paraffin, and the bottles kept in a cool place. The althæa root should be washed well before use. A syrup of althæa, prepared on similar lines, is said (Pharm. Post, 1894, 617) to have remained perfect for over a year.

ELIXIRS.

Aromatic Elixir Formulas.—In the Pharm. Era, 1895, 12, appear the following formulas:

Oil orange (fresh)	96 Min.
Oil lemon	24 Min.
Oil coriander	6 Min.
Tincture vanilla, U. S. P.	2 fl. oz.
Tincture cardamom, simple	2 fl. oz.
Powdered chocolate (Hance's or Baker's)	2 oz.
Alcohol	32 fl. oz.
Syrup, simple	48 fl. oz.
Water (filtered through charcoal) enough to make	1 gallon.

Filter and clarify with purified talcum.

(1) Dissolve the oils in 8 fluid ounces alcohol, add 24 fluid ounces water, and the balance of the alcohol; shake well.

(2) Dissolve chocolate in 6 ounces hot water, add the syrup, shake well, add the tinctures of cardamom and vanilla, the solution of oils, and enough water to make 1 gallon. Filter through paper, on which about 1 ounce talcum has been distributed; return the first part until the filtrate is clear. *Cost.*—$1.16 per gallon.

Oil of sweet orange (recent)	3 drams.
Alcohol	29 drams.
Oil of caraway seed	5 drops.
Essence of cinnamon	8 drops.
Simple syrup	9 oz.
Glycerin	2 oz.
Distilled water	1 oz.
Filter through calcium phosphate	3 drams.
Add enough simple syrup to the filtrate to complete	1 pint.

The cost of this elixir will not exceed 15 cents per pint.

Oil orange, best	½ fl. oz.
Oil cinnamon, Ceylon	6 drops.
Oil anise	6 drops.
Oil caraway	10 drops.
Simple syrup	46 fl. oz.
Sherry wine	5 fl. oz.
Alcohol, 95 per cent	22 fl. oz.
Water	40 fl. oz.
Tincture vanilla	2 fl. oz.
Carbonate magnesia	1½ oz.

Mix the oils with the magnesia; mix the alcohol, wine and water, and add to the mixture of magnesia and oils, then add the vanilla and the syrup. Let stand an hour, shaking often. Filter and pass through filter enough water to make the whole measure seven (7) pints. Cost, 90 cents per gallon.

Elixir of Calisaya and Coca.—In the Montreal Pharm. Jour., 1894, 336, appears the following formula :

Calisaya bark, No. 60 powder	640 grains.
Oil of orange	1 dram.
Oil of lemon	10 minims.
Oil of coriander	5 minims.
Alcohol	4 fl. oz.
Hydrochloric acid	10 minims.
Water	3 fl. oz.
Glycerin	3 fl. oz.
Fluid extract of coca	2 fl. oz.
Syrup, enough to make	1 pint.

Percolate the powder with a mixture of the oils and alcohol, hydrochloric acid, glycerin and water, adding alcohol and water mixed in the above proportions to make the percolate measure 10 fl. oz. To this percolate add the coca and sufficient syrup to make 16 fl. oz. Add to this a little Fuller's earth, shake well and filter, adding through the filter sufficient simple elixir to preserve the volume. This elixir is calculated to contain the virtues of 5 grains of calisaya bark and 7½ grains of coca leaves in each fluidrachm.

Elixirs of Calisaya or Cinchona.—The following formulas are given in Chem. and Drug., 1895 (January 5), 21 :

No. 1.

Quininæ sulph	gr. xxx.
Cinchonidiæ sulph	gr. xv.
Aquæ bullient	℥ viij.

Solve et adde—

Elixir. aromat. U. S. ad	cong. j.
Tinct. persionis comp	q. s. to color deep red.

No. 2.

Cort. cinch. rub	3 lbs., 2 ozs.
Cort. cinnam	6 oz.
Fruct. coriand	3 oz.
" anisi	3 oz.
" carui	1¾ oz.
Sem. angelicæ	¾ oz.
Rad. angelicæ	163 grs.
Spt. vini gallici	32 oz.
Aquæ	288 oz.
Syrup. aurantii	30 oz.
Spt. vini rect	1 gall.
Spt. hibernici	½ gall.
Syr. simpl.	1½ gall.
Tinct. persionis	q. s.

Color light pink.

Quick Elixir of Iron, Quinine, and Strychnine.—Chas. E. Green furnishes the following formula for an elixir of iron, quinine and strychnine that will bear dilution with water to any extent, and which is quickly prepared.

Sol. ferric chloride	112 C.c. (3¾ fl. oz.)
Phosphoric acid, 50 per cent	40 C.c. (1 1–3 fl. oz.)
Quinine alkaloid	28.512 Gm. (7 1–3 drs.)
Strychnine alkaloid	0.416 Gm. (6 grs.)
Alcohol	120 C.c. (4 fl. oz.)
Aromatic elixir, N. F	1200 C.c. (39½ fl. oz.)
Tincture Cudbear	60 C.c. (2 fl. oz.)
Syrup To make	1892 C.c. (4 pts.)

Place the solution of ferric chloride in a capacious mortar, with the phosphoric acid, and mix thoroughly; add the quinine alkaloid (dried at 100° C.) together with the strychnine alkaloid, but do not beat to a mass; now add the aromatic elixir previously mixed with the alcohol, and thoroughly mix; place the whole in a graduated receptacle, and add syrup to the measure of 1832 C.c. (3 pts. 13 fl. oz.); finally add the tincture cudbear, and filter if necessary.

This elixir, it is claimed, mixes clearly with diluted phosphoric acid, and with water. The author has kept a sample of it for over a year, and at the end of that time has found it in as good condition as when first made, so far as stability and appearance were concerned.—Merck's Mark. Rep., 1894, 245.

Clearly Miscible Elixir of Iron Phosphate, Quinine and Strychnine.—The formula which C. T. Heller has used for the last three years, as elicited at the recent meeting of the Minnesota Pharmaceutical Association, has always given him entire satisfaction; the elixir is easily made, it is maintained, and clearly miscible with water. The formula is as follows:

Iron pyrophosphate, U. S. P.	256 grains.
Quinine (alkaloid)	64 "
Strychnine	1¼ "
Alcohol, Water, Syrup	of each 2 fl. oz.
Aromatic elixir	enough to make 16 "

Dissolve the iron pyrophosphate in the water, the quinine and strychnine in the alcohol; mix the two solutions, shake, add the syrup, and lastly the aromatic elixir; set aside a few hours and filter if necessary. On adding the iron solution to the solution of the alkaloids, a thick curdy precipitate occurs; this should not occasion alarm, if the elixir be set aside it will clear up in an hour or so.

Elixir of Three Phosphates.—O. A. Rouillon (Amer. Drug. and Pharm. Rec., 1894, Nov. 25) gives the following formula:

Iron phosphate	256 grains.
Quinine sulphate	128 grains.
Strychnine sulphate	1½ grains.
Ammonium phosphate	128 grains.
Citric acid	256 grains.
Boric acid	192 grains.
Alcohol	1 fl. oz.
Water	6 fl. drachms.
Aromatic elixir	16 fl. ozs.

Dissolve the ammonium phosphate, citric acid and boric acid in 12 fl. oz. of the aromatic elixir; then add the sulphates of quinine and strychnine. With three drachms of water make a solution of the iron phosphate, using the water as hot as may be necessary; then mix the solutions, adding the alcohol and enough elixir to bring the bulk up to 16 fl. oz.

Elixir of Pepsin, Bismuth and Strychnine.—O. A. Rouillon (Ibid., 1894, 426) gives the following modification of the National Formulary formula:

Strychnine sulphate	1½ grains.
Pepsin	128 grains.
Bismuth and ammonium citrate	256 grains.
Tartaric acid	138 grains.
Water of ammonia	a sufficient quantity.
Glycerin	2 fl. oz.
Alcohol	5 fl. oz.
Syrup	3 fl. oz.
Compound elixir of taraxacum	1 fl. oz.
Water, enough to make	16 fl. oz.

Dissolve the pepsin in 3 fl. oz. of water. Dissolve the tartaric acid in 1 fl. oz. of water, and to the solution so formed add water of ammonia until the acid is neutralized. In this solution dissolve the bismuth and ammonium citrate and the strychnine sulphate; then mix the two solutions and add the glycerin, compound elixir of taraxacum, alcohol and syrup. Lastly filter through a wetted filter, adding enough water to make the filtrate measure 16 fl. oz.

EMPLASTRA.

Emplastrum Belladonnæ.—R. A. Cripps suggests the following formula:

Liquid extract of belladonna	4 fl ozs. or 100 C.c.
Resin plaster, Soap plaster } of each	2½ ozs. or 62½ Gms.

Evaporate the liquid extract of belladonna by the heat of a water-bath

until it is reduced to 1 ounce (or 25 Gm.), then add the plasters, previously melted, and mix the whole thoroughly together. It contains 0.5 per cent. of alkaloids.—Pharm. Jour. Trans., 1895, 795.

Emplastrum Salicylicum Saponatum.—H. Klotz communicates to the Monatsblatt des N. Y. Deutschen Apotheker-Vereins a formula for *saponated salicylated plaster* which is claimed to be an improvement on the one in vogue, the product not becoming hard as usual. The ingredients and proportions recommended are:

Emplastrum saponatum	40.0–42.5
Emplastrum diachylon simplex	40.0–42.5
Petrolatum	15.0–10.0
Acidum salicylicum	5.0

—West. Drug., May, 1895.

EMULSIONES.

Casein for Emulsions.—That milk, the most perfect emulsion known, is formed by the intervention of casein, is a well understood fact. Basing on this, a saccharated casein powder has been recommended as a substitute for the various gums employed as emulsifiers, the advantages claimed being that such emulsions are more perfect, more permanent, and better borne by the stomach. According to Frank Blankinship (Pacific Drug Review) a good saccharated casein powder may be obtained by the following process: Add ammonia in the proportion of ½ fluidounce to 1 quart of fresh milk, shake the mixture well and set aside for 24 hours, when it will have separated into two layers, the upper being the semi-saponified fatty constituents, the lower constituting the lactoserum. The latter, after separation, is treated with acetic acid until all the casein has been precipitated. Remove from the magna as much of the moisture as possible by pressure, add 10 grains of sodium bicarbonate, and then incorporate, by means of trituration, enough sugar so that, after drying, it shall represent 10 per cent. of the entire mass. Preserve in well stoppered vials. The powder will keep for several years.—West. Drug., 1894.

Continental Method of Emulsification.—W. T. Taylor sums the points in favor of the continental method as follows: (1) It gives more uniform and better results. (2) It has a wider range of adaptability. (3) It saves time. (4) It calls for the exercise of less skill.—Bull. Pharm., 1895, 253.

Emulsion of Cod-liver Oil and Hypophosphites.—W. P. De Forest describes his method of preparing this emulsion as follows: Take of

Acacia	oz. 3½
Sugar in fine powder	oz. 6
Cod-liver oil	oz. 32
Oil gaultheria	dr. 2
Calcium hypophosphite	oz. ½
Sodium hypophosphite	oz. ½
Water	oz. 16

Place the acacia and sugar in a bowl or large mortar and mix the oils with them by means of a pestle ; then adding the water, in which the hypophosphites have previously been dissolved. Plunge into the mixture a vaginal syringe and work it vigorously until the emulsion is completed. He claims the greatest possible subdivision of the oil globules by this syringe method. It may here be recalled that the originator of this method is Mr. Chas. F. Hartwig, of Chicago, who published a paper on this subject in the "Pharmacist," in 1875.—West. Drug., 1895, 102. (See, also, Amer. Drug. and Pharm. Rec., 1894, 425.

Estimation of Cod Liver Oil Emulsions.—H. W. Schimpf uses the method of extraction in a Soxhlet Extraction Apparatus, or proceeds as follows :

Fit a large test-tube with a cork provided with a wash-bottle arrangement. Introduce into this tube 2 Gms. of the emulsion and about 10 C.c. of ether, close with a good cork, shake the tube for five minutes, and set it aside so that the liquids will separate. Then insert the cork having the wash-bottle arrangements, and by blowing into the shorter tube, draw off the the supernatant ethereal solution. Repeat the process with successive portions of ether until the oil is completely extracted. Then mix the ethereal solutions and evaporate or distill off the ether, and weigh the residual oil.

The oil is known to be completely extracted when a few drops of the last portion of the ether drawn off leaves no residue upon evaporating on a watch glass. This latter method, because of the simplicity of the apparatus required, is well adapted for the use of the pharmacist. It requires, however, more ether than the other method, but this may all be recovered by means of an easily improvised still. Benzine, which boils to the last at 45° or 50° C. and leaves no residue, may be used instead of stronger ether.—Amer. Drug. and Pharm. Rec,, 1894, 425.

Emulsion of Cod-liver Oil with Pancreatin and the Hypophosphites.—The following improved formula is given for a stable emulsion of cod-liver oil with pancreatin and the hypophosphites :

Cod-liver oil, best	400	parts.
Fresh milk	400	"
Glycerin, purest	400	"
Gum arabic	9	"
Pancreatin	10	"
Sodium hypophosphite	12	"
Calcium hypophosphite	12	"
Essence of lemon, sufficient	1–1½	"

Dissolve the gum arabic and pancreatin in the milk and the hypophosphites in the glycerin. Mix the solutions and add the oil little by little to the mixture, with constant agitation. Finally add the essence of lemon.—Jour. de Pharm. d' Anvers ; Nat. Drug., 1895, 80.

Emulsion of Petroleum.—J. W. England (Amer. Jour. Pharm., 1895, 328) in a "Review of Martindale's Extra Pharmacopœia" gives a formula for an emulsion of petroleum with hypophosphites as follows:

Petrolatum	5 ozs.
Sodium hypophosphite	2 drs.
Calcium hypophosphite	2 drs.
Powdered acacia	2½ oz.
Water	to make 15 fl. oz.

Mix the petrolatum with the acacia, and add 4 fl. oz. of water. Dissolve the sodium and calcium hypophosphites in 6 fl. oz. of water. Add to the above with constant trituration, and then add a sufficient quantity of water to measure 15 fl. oz. The dose is from 1 to 4 teaspoonfuls.

Extract of Malt with Cod-Liver Oil.—H. W. Jones. The method of assay was as follows: 5 Gm. was dissolved in 50 C.c. of water, placed in a stoppered glass separator, and 50 C.c. of ether added. After standing till the ether containing the dissolved oil had separated, the entire upper layer with flocculent matter (a small quantity of emulsified ether and extract) was separated from the clear layer of malt solution. The latter was washed with 25 C.c. of ether, and the combined ethereal solutions allowed to evaporate spontaneously in a glass dish with upright sides. The residue was re-dissolved in ether, to separate the small amount of extract, dried in a water oven after evaporation, and finally weighed. The following table gives the percentages obtained; the amount of volume being calculated from the percentages by weight, the specific gravity of the samples, and of average cod-liver oil:

	Percentage of Weight.	Percentage of Volume.	Consistence.
A	22.76	29.5	Semi fluid.
B	17.82	24.0	Thick.
C	14.48	20.1	Thick.
D	1.38	2.0	Thick.

—Pharm. Jour. Trans., 1894, 162.

Extracta.

An Improvised Container for Dry Extracts has been devised by an Austrian apothecary, intended to prevent agglutination of the powdered extracts. The improvement consists in a hollow glass stopper, in which quick-lime may be kept in such a manner as to admit of the absorption of any moisture in the vial.—West. Drug., 1895, 191.

Ash in Extracts.—For the determination of K_2CO_3 in the ash of extracts, Dieterich adds 20 C.c. of water to the ash from 2 Gm. of extract, warms,

filters when cold, and washes the dish and filter with 10 C.c. of water and adds a few drops of tropæolin solution (1 : 100) and titrates with $\frac{N}{100}$ sulphuric acid solution.—Pharm. Centralh., 1894, 608.

A New Process for Vegetable Extracts.—Meyer, of Brunswick, has obtained a patent for a peculiar method of preparing vegetable extracts. He triturates the substance with sea salt, expressing the juice from the mass after a certain time. The resulting fluid is concentrated to a syrupy consistence, and a large portion of the salt thereby deposited, or if not, the mass is dialyzed to remove a portion of it, and further concentrated. The practical utility of this process is not obvious.—Moniteur Scientifique ; Brit. and Col. Drug., 1894.

Relative Alkaloidal Value of Green and Brown Extracts.—M. Ferdinand Ranwez demonstrates that in the case of vegetable extracts, those prepared without filtration of the juices before the addition of alcohol, and which (as a consequence of the retention of chlorophyll, fecula, etc., are green in color when finished) are considerably richer in alkaloidal contents than those in which filtration has been used, and which are brown in color when finished. Among the curious and apparently contradictory results which confronted Ranwez in the outset of his investigation was the fact that he obtained a greater amount of extractive from the stems or stalks than from the leaves. Reasoning a priori, the contrary would be expected, and has in fact been a generally accepted fact, as, apparently, the result of experience. In the leaves the parenchyma is most abundant, while in the stem the ligneous structure predominates, and the poverty of the latter in aqueous juices is a well established fact. Ranwez, however, shows that while the amount of juice yielded by the leaves is largely in excess of that obtained from the stems, the amount of extractive in the latter is conversely in excess. The paper of the author is much too large to quote here, but it shows that green extracts, or those produced by retaining the chlorophyllic fecula, are from 10 to 15 per cent. richer in alkaloidal contents than the brown extracts.—Acad. de Méd. Royale ; Nat. Drug., 1895, 181.

Examination of Commercial Fluid Extracts.—Haussmann (Amer. Jour. Pharm., 1895, 291) considers first the variations in the physical properties, and then the alcoholic strength.

The following table gives the results obtained :

Fluid extract.	Specific Gravity.	Pharmacopœial menstruum in alcohol percentage by volume of official.	Alcohol percentage found.	
			Weight.	Volume.
Buchu	0.885	Alcohol.	76	82
Buchu	0.956	Alcohol.	56	64
Cimicifuga	0.873	Alcohol.	76	82
Cubeb	0.882	Alcohol.	73	80
Rhubarb	1.0095	80	55	63
Serpentaria	0.9255	80	61	69
Calumba	1.042	75	34	41
Senega	1.0085	75	43	51
Chirata	0.989	66	38	45
Digitalis	1.008	66	43	50
Phytolacca root	0.9855	66	51	59
Hydrastis	1.080	60	26	31
Gentian	1.0985	50	27	32
Rhamnus purshiana	1.052	50	12	15
Senna	1.080	50	25	31
Stillingia	0.9855	50	36	43
Taraxacum	1.103	50	12	15
Glycyrrhizza	1.0395	30	23	28
Sarsaparilla comp	1.0465	30	6	7
Triticum	1.1296	25	17	21
Prunus Virginiana	1.1025	.....	30	36

In the last mentioned extract the exact alcoholic percentage of the menstruum cannot be stated, as the Pharmacopœia directs the drug to be macerated with a mixture of water and glycerin, to be followed by percolation with a mixture of 85 parts alcohol and 15 parts water.

The largest percentage of alcohol in fluid extracts, whose menstruum consists entirely of that liquid, was found in F. E. Cimicifuga, the smallest in F. E. Buchu.

The two samples examined of the latter were from different manufacturers, and a glance upon the table will reveal a decided difference in their respective alcoholic percentages. Fluid extracts for which the Pharmacopœia directs a menstruum of 2 parts of alcohol to 1 of water, contained a comparatively larger alcohol percentage than those for which the same authority requests an alcoholic menstruum of 3 parts of alcohol to 1 part of water. F. E. of Calumba, which belongs to the latter class, was found to contain only 34 per cent. of absolute alcohol, while F. E. Phytolacca, representing the former, contained 51 per cent.

A small alcoholic percentage was also found in a syrupy F. E. Hydrastis.

Remarkable variations were found in fluid extracts with a supposed-to-be diluted alcohol menstruum. The largest percentage found was in F. E. Stillingia, 36 per cent., which is closely approximate to the pharmacopœial requirement.

F. E. Cascara Sagrada and Taraxacum contained only 12 per cent. of alcohol by weight.

Compound F. E. Sarsaparilla, with a menstruum of 30 per cent. of alcohol, was found to contain 6 per cent. by weight, while F. E. Glycyrrhiza, with the same alcoholic percentage menstruum, contained 23 per cent.

Glucose in Fluid Extracts.—The syrupy condition of some commercial fluid extracts and the sweet taste occasionally observed in preparations from bitter or acrid drugs, induced the writer to determine the percentage of an allied substance, which has the property of giving the various glucose reactions.

In addition to this, the negative result experienced in some instances, where the preparations were made from drugs which are not stated to have an appreciable saccharine percentage, or whose sugar, if present, is stated not to possess the power of reducing Fehling's solution, was also the basis for these examinations.

Such was, for instance, found to be the case with several samples of F. E. Gentian, which showed by repeated examination the presence of 5 per cent. of a substance corresponding to glucose in every respect.

According to published authorities, gentianose, the sugar present in gentian root, does not reduce Fehling's solution. This has not been the writer's experience, either in the commercial fluid extract or in a sample which was prepared strictly according to the pharmacopœial directions. The remarkably high sugar percentage of some fluid extracts prepared from ranunculaceous plant drugs, which, on comparison with similar official fluid extracts, showed a vast difference, was likewise another reason for this investigation.

The fallacious popular idea that darkness in color is an indication of strength and a criterion of quality, is unfortunately also accepted by a number of pharmacists.

Caramel also has the property of reducing Fehling's solution, and forms, in some fluid extracts, when examined for glucose, an important factor.

Glucose cannot be detected with certainty directly in fluid extracts, or liquids containing other vegetable matter. These compounds, as, for instance, tannin, have also the property of reducing Fehling's solution, and must, therefore, first be removed.

The process recommended in Dragendorff's Plant Analysis, precipitation with basic lead acetate, and subsequent treatment with sulphuric acid, was employed.

Ten C.c. of the fluid extract under examination was diluted with water to 20 C.c.

In most cases the mixture became cloudy, and filtration, until a clear liquid was obtained, was necessary.

The mixture was then precipitated with basic lead acetate solution,

filtered from the precipitate, and the excess of lead in the filtrate carefully precipitated by diluted sulphuric acid.

The liquid, by means of washing the precipitate with water, was made up to the original volume of 20 C.c.

As a rule the effect of picric acid test solution upon the liquid representing 50 per cent. of the fluid extract was first noted, and also a superficial examination for glucose, made by means of the picric acid and potash method of Braun, with the intention of determining the necessary degree of dilution before making the volumetric examination with Fehling's solution.

A few statements must be made regarding fluid extracts in general before quoting the results obtained. In samples containing caramel, if the same is present in considerable amount, the filtrate, after the lead and acid treatment, is of a brown color.

Caramel is not precipitated by basic lead acetate, and through this fact evidence of its presence was shown in a number of fluid extracts.

For instance, in a sample of F. E. Taraxacum, prepared by the writer according to the Pharmacopœia, the final filtrate, after this treatment, was almost colorless, while in several commercial specimens, similarly treated, the same was decidedly brown. A like observation was also made with F. E. Gentian and several others.

The Products of Eight Laboratories Examined.—The amount of the substance which reduces Fehling's solution and gives reactions with other glucose reagents, varied considerably, some extracts showing a high percentage, while others only contained scarcely appreciable traces. Due to lack of time, the percentage was not ascertained in some, while in a number several determinations were made.

The following were the figures obtained :

1. Twenty samples were examined of this firm, and they are arranged according to the amount of glucose found.

Five per cent. and over, E. E. taraxacum, triticum, gentian and cimicifuga.

Four per cent., F. E. Cascara Sagrada. 3.5 per cent. F. E. Rheum. 2.5 per cent., Buchu, Prunus Virginiana, Senna, Hydrastis, Asclepias.

One per cent., Grindelia Robusta, 0.833 per cent. Humulus and Digitalis, 0.5 per cent. Ipecacuanha.

F. E. Belladonna leaves, Calumba and Nux Vomica also contained sugar in small amount, but no quantitative estimation was made.

F. E. Coca contained less than 0.5 per cent.

F. E. Cubeb, which was also examined, was found perfectly free from all saccharine matter.

2. From this source eight samples were examined, quantitative determinations being made in each case.

The largest percentage found was 5 per cent. in F. E. Pulsatilla ; 3.5

per cent. was found in Cypripedium; 3 per cent. in Buchu; 2.5 per cent. each in Frangula, Ipecacuanha and Pilocarpus; 0.5 per cent. in Rhus Glabra; while the smallest amount found was in F. E. Damiana, namely, 0.35 per cent.

3. Five extracts were examined from this source.

The average glucose percentage of these preparations was small, the largest amount being found in F. E. Stillingia, which contained 1.66 per cent., the smallest in F. E. Aconite Root, which only gave indication to the extent of 0.1 per cent.

F. E. Dulcamara contained about 1.5 per cent.; Belladonna root 1.25 per cent., and Eucalyptus, 0.625 per cent.

4. This source furnished five samples.

The largest amount was found in F. E. Phytolacca fruit, which was over 7 per cent.

This is, however, no criterion, as the drug contains considerable fruit sugar.

F. E. Granati Rad. Cortex gave indication of 0.67 per cent.; Euphorbia pilulifera, 0.5 per cent.

F. E. Pichi and Quebracho were also examined and revealed but small amounts, so that a quantitative estimation was not made.

5. Four samples were examined from this source. The largest percentage was found in F. E. Bryonia, 1.668 per cent.; in Hydrangea, 0.712, while in F. E. Xanthoxylum and Lippia Mexicana the exact amount was not ascertained.

6. Three samples were procured from this source. The largest percentage was found in F. E. Convallaria, which was 2.5 per cent.; F. E. Stigmata Maydis contained 1 per cent.; while F. E. Belladonna Leaves showed 5 per cent.

7. Two samples were obtained from this firm. The largest amount of glucose was found in F. E. Burdock Root, which was 5 per cent. F. E. Pimpinella contained 1.67 per cent.

8. The two samples from this source were F. E. Coca and Humulus.

The hop fluid extract contained the largest amount, 2 per cent.; the other contained 1 per cent.

A few remarks may perhaps be not inappropriate regarding these determinations.

The remarkably high glucose percentage in some of the representatives of the Ranunculaceæ, 5 per cent. each in F. E. Cimicifuga and Pulsatilla, obtained, by the way, from different manufacturers, induced the writer to determine the amount of glucose in F. E. Cimicifuga, prepared by himself.

While traces of glucose were present, determinations by Fehling's solution showed the presence of less than 1 per cent.

The small amount present was also indicated by the fact that Braun's or Boettger's bismuth test, when applied, responded but feebly.

This is remarkable, as the commercial extract examined bore but little evidence of the presence of caramel. (In the pulsatilla sample, the presence of the latter was, however, very evident.)

To determine whether the process of evaporation of the final percolate produced any material change in the glucose percentage found, examination was made, respectively, before and after the evaporated extract was incorporated with the reserved portion, but no material difference was revealed.

Similar determinations were made with fluid extract of gentian and rhubarb, with a like result.

Evaporation at the temperature directed by the Pharmacopœia does not appear to produce any material change—in particular, no appreciable increase of the glucose percentage.

Comparison was also made between fluid extracts prepared from the same drug and obtained from different manufacturers.

Considerable variation in color is frequently observable, and this is in many instances due to the presence of caramel.

Regarding their glucose percentage, some variation also exists.

In a sample of F. E. Buchu, the percentage of one sample was 2.5; of another, 3 per cent. The filtrate of the former, after the lead and acid treatment, was almost colorless; of the latter, a decided brown.

In F. E. Belladonna Leaves the glucose percentage of one sample was 0.5 per cent.; of another, less than 0.2 per cent. Incidentally it may be noticed that the narcotic fluid extracts in general appear to contain but little sugar.

This was observed in F. E. Belladonna Leaves, Hyoscyamus, and also in Digitalis.

F. E. Coca Leaves, of a deep black color, obtained from one firm, showed a glucose percentage of 1, while the dark green preparation of another firm showed less than 0.5 per cent.

F. E. Humulus, from one firm, strongly alcoholic, precipitating resin on dilution with water, gave indication of about 0.830 per cent. of glucose, while the dark brown miscible extract from another source indicated 2 per cent.

F. E. Ipecacuanha showed in one instance a percentage of 0.5; in another, 2.5 per cent.

Other comparisons were also made, but the above may illustrate the claim that commercial fluid extracts, as a rule, are not alike in physical properties and composition as obtained from different manufacturers.

Interesting revelations are made in some fluid extracts after subjecting them to the lead and acid treatment mentioned.

If to the final filtrate picric acid test solution is added, alkaloids, if present in the drug, will be indicated.

Among those affected in this manner may be mentioned F. E. Coca,

Ipecac, Hydrastis, Quebracho, Cimicifuga, Xanthoxylum, Calumba, and a number of others.

Fluorescent compounds were revealed in the filtrates from F. E. Pichi and Hydrangea, the fluorescence in each being increased by the addition of an alkali.

Comparison was also made between commercial fluid extracts and some prepared from the same drug according to pharmacopœial directions.

F. E. Cimicifuga has already received mention.

F. E. Gentian readily reduces Fehling's solution, both in the official and commercial preparations.

The samples of the commercial extracts examined, however, showed a glucose percentage of over 5 per cent., while the official preparation was found to contain 2.5 per cent. A like result was also found in F. E. Taraxacum.

This preparation, when made according to the Pharmacopœia, contained between 2 and 3 per cent. of glucose, while two samples of the commercial fluid extract showed between 5 and 6 per cent. to be present. The presence of caramel was, however, noticeable in both.

A sample of commercial F. E. Calumba gave ready indication of the presence of glucose, while the preparation made from the drug by the writer was found to be perfectly free from the same. All the available tests for glucose gave a negative indication of its presence.

F. E. Rhubarb, prepared by the writer, was found to contain about 1 per cent. of glucose.

Two commercial samples were found to contain respectively 3 and 4 per cent.

A number of similar comparisons were also made, furnishing, in the main, like results.

Incidentally it may also be mentioned that, while making the above examination, the presence of possible metallic contamination was also inquired into. In a number of commercial samples the presence of copper was easily detected, showing that but little discrimination was used in the selection of the working utensils.

The importance of self-manufacture in this class of preparations cannot be too strongly urged upon the pharmacist, if it is his desire to comply strictly with the Pharmacopœia.

While it is impossible for him to do so in every instance, there is no reason why he should not manufacture those frequently used, and in whose reliability he can have absolute confidence.

Extractum Belladonnæ Alcoholicum.—R. A. Cripps suggests the following formula:

Liquid extract of belladonna	21 fl. ozs. or 1050 C.c.
Sugar of milk in powder	a sufficiency.

Take 1 fl. oz. (or 50 C.c.) of the liquid extract of belladonna, evaporate it in a tared dish over a water-bath, until it is reduced to a moderately firm extract, and weigh. The difference between the weight of the extract and ¼ oz. (or 12.5 Gm.) will give the amount of sugar of milk required for 1 fl. oz. of the liquid extract: Distill off the spirit from the remaining 20 fl. ozs. (1000 C.c.) of liquid extract, add the required amount of sugar of milk as shown by experiment, and evaporate over a water-bath to a firm extract, which should weigh 5 ozs. or 250 Gm. This extract will contain 3.0 per cent. by weight of the alkaloids of belladonna.—Pharm. Jour. Trans., 1895, 795.

Extractum Belladonnæ Liquidum.—R. A. Cripps suggests the following formula:

Belladonna root in No. 20 powder ..... 2 lbs. or 1280 Gm.
Rectified spirit, ...
Distilled water ..... } of each a sufficiency.

Divide the belladonna root into four equal portions, and moisten the first with 6 fl. ozs. (or 240 C.c.) of a mixture of 7 fl. parts of rectified spirit with 1 fl. part of distilled water; allow to stand in a covered vessel for six hours, then pack firmly and uniformly in a percolator. Pour over the surface of the powder 4 fl. ozs. (or 160 C.c.) of the same mixture of spirit and water, and when the liquid begins to drop, close the lower orifice of the percolator and allow to macerate for twenty-four hours. Now continue slow percolation, adding more of the same menstruum as required, and use the first 6 fl. ozs. of percolate to moisten the second portion of belladonna root. Collect now the percolate in fractions of 4 fl. ozs. each, or less, and having packed the second portion of moistened root in another percolator, use the fractions of percolate successively for its extraction, carrying on the operation exactly as in the first percolator. The first 6 fl. ozs. from the second percolator is used to moisten the third portion of powder, and this system of re-percolation is carried out through the whole series of percolators. Reserve the first 12½ fl. ozs. of percolate from the fourth percolator and recover the spirituous liquor from the marc by displacement with water or pressure. This weaker percolate may be used instead of fresh menstruum when again preparing the liquid extract, or it may be concentrated to an extract, dissolved in rectified spirit, and added to the reserved portion of percolate. The proportion of alkaloids in the reserved percolate is determined by the following process: Introduce 10 C.c. into a separator, add an equal volume of chloroform with 50 C.c. of distilled water and a decided excess of solution of ammonia, agitate and set aside for the liquids to separate; draw off now the chloroform and agitate the aqueous liquid with another 10 C.c. of chloroform, drawing off as before; repeat a third time, and reject the aqueous liquid. Agitate the mixed chloroform solutions thoroughly with 5 C.c. of dilute sulphuric acid,

mixed with twice its volume of warm distilled water; separate the chloroform, and agitate with a second portion of acidulated water. Wash the mixed acid liquids with a little chloroform, then agitate vigorously with 10 C.c. of chloroform and an excess of solution of ammonia, drawing off the chloroform when it has separated. Repeat this agitation and separation twice with half the quantity of chloroform, wash with a small quantity of distilled water, draw off into a tared flask or dish, evaporate dry, and weigh. Dissolve now the alkaloidal residue in 10 C.c. of $\frac{N}{20}$ HCl, and finally add $\frac{N}{100}$ NaOH, till neutral, using methyl orange or iodeosine as indicator. From this calculate the amount of alkaloids, 1 C.c. $\frac{N}{100}$ NaOH being equivalent to .00289 Gm. of atropine. This should correspond closely with the amount found by weighing. Add now to the remainder of the reserved percolate sufficient of the original menstruum to produce a liquid containing 0.75 part of alkaloids in 100 fl. parts.—Pharm. Jour. Trans, 1895, 795.

Extractum Bursæ-pastoris Fluidum is claimed by Oefele to surpass the effects of fluid extracts of Hydrastis canadensis as a hæmostatic. Single doses 10 to 15 Gm., daily dose 30 to 50 Gm. It has been highly recommended in bleeding of the uterus, kidneys, bladder, and especially in nose bleeding. The active principle is claimed to be the bursinic acid, which in form of sodium or iron salts is given in doses of 0.1 Gm. five times daily.—Pharm. Centralh., 1894, 446.

Extract of Beef.—J. Price makes a solution of one fluid drachm of HCl (U. S. P.) and two fluid ounces of essence of pepsin, and of this solution three fluid drachms are added to one pound of finely minced beef, and placed in a quart jar with constant agitation every half hour. In two hours it is ready for use. It must be kept cool. Dose, two fluid ounces with suitable flavoring.—Amer. Drug. and Pharm. Rec., 1894, 9.

Cod Liver Oil Extract.—F. Lascar recommends the preparation of extracts by means of either cold or warm alcohol from the oil. About 3 per cent. of extract is yielded by the yellow oil, while twice this amount is obtained from the brown oil.—Drug. Circ., 1895, 27.

Fluid Extract of Ergot by the Salt Process.—Bernegau and Burkhart report as follows (Apoth. Zeit., 1895, 309). 200 parts of fresh and coarsely-powdered ergot are mixed with ten parts of pure salt, and then moistened with a mixture of two parts wine spirits and eight parts water. The moist mass is firmly packed in the percolator; then pour on enough of the menstruum mentioned to cover the mass. Permit the menstruum to act for twenty-four hours, then regulate so as to permit fifteen drops to flow off per minute. The first extract will amount to 170 Gm., which is set aside. The second extraction is prolonged until the liquid becomes colorless—a proof that the drug is exhausted. The second extract is now condensed to 30 Gm. and mixed with the first extract, the total amount-

ing to 200 Gm. One part fluid extract ergot is thus the equivalent of one part fresh ergot. The extract is of a handsome dark color, is clear, and of pronounced odor. The presence of five per cent. salt is of no physiological significance when injecting. A syringe bears in each C.c. 0.05 NaCl, whereas in the experiments with morphine solutions prepared with sodium chloride each C.c. of solution contained 0.082 NaCl. At that time neither irritation nor pain was observed.—Bull. Pharm., 1895, 259; see also Ber. d. Pharm. Gesellsch., 1895, 171; and Pharm. Post, 1895, 283.

Extract of Guarana.—M. A. Miner (The Apothecary, 1894, iv., p. 16) has found by experiment that the best menstruum in preparing solid extract of guarana, is a mixture of two volumes of alcohol and one volume of water. This dissolved from guarana 27.86 per cent. of extract, from which he obtained 15.25 per cent. of caffeine. It is stated that a light-brown powder was easily obtained from this extract by trituration, which retained its pulverulent form on keeping, without any addition of milk-sugar. This powdered extract then, being economically prepared, permanent, and a little over four times the strength of the drug, is a satisfactory preparation. It could advantageously be reduced with sugar of milk so as to represent three times its weight of guarana; or it might, still better, be made to contain a fixed percentage of caffeine. The amount of extractive obtained by the use of a mixture of two volumes of alcohol and one volume of water, in exhausting the drug, is thus not unduly increased over that by the official menstruum for the fluid extract. It would seem desirable, therefore, to substitute it for the latter.

Extract of Indian Hemp.—David Hooper.—A description of extracts of Indian Hemp obtained from various sources and comparisons of them with extracts of English origin. This paper has particular reference to the Pharmacopœial extract, and deals with its preparation from different varieties of "ganja," its composition, and examination of commercial extracts. In conclusion, it was stated that many dealers in India renew their stock of "ganja" annually, and always consider the drug worthless after being kept three years. It was suggested therefore that the loss of reputation of the extract in England may have been due to failure of action owing to the decomposition of the active principle present.—Pharm. Jour, Trans., 1894, 246.

Extract of Indian Hemp.—Cartes (Rep. de Pharm., 1894, 257) says that the drug possesses its maximum activity at the time of flowering, and the flowering tops are the most active portion of the plant. Personne, Smith and others, agree that the active principle is a resin, mixed with a volatile oil of complex composition. So that the choice of the plant used and its parts has a material effect on the activity of the drug. Three varieties are manufactured in different pharmacies: (1) The hydro-alcoholic

extract of the Codex, obtained by exhausting the dry leaves with 60 per cent. alcohol; (2) the alcoholic extract of the international Pharmacopœia, consisting of the extract obtained by 90 per cent., alcohol, extracted with water after driving off the alcohol; (3) the fatty extract is the extract from the flowering tops, taken out with melted butter fat. The third variety is certainly the most active, but as each prepares it according to his own formula, even this cannot be expected to be constant. That of the international Pharmacopœia, of course, loses its value on account of the elimination of the most active ingredients through the extraction with water. That of the Codex is the one, however, that should be supplied, unless ordered to the contrary, and at all events can be relied upon as being very regular in its action and constant in its composition.

Extract of Jurabeba.—This is an extract of solanum paniculatum of South America, and is strongly recommended as a stomachic, and for the treatment of liver colic. It is given in doses of 15–50 grains per day.—Rep. de Pharm., 1894, 543.

The Analysis of Malt.—J. R. Miller having tried several methods, thinks the following process is the best: 50 Gm. of the sample is put into a weighed copper beaker, and mixed with 200° C.c. of water at 40° C., which temperature is gradually increased to 60° C. After 20 minutes digestion, a few drops of the liquid is tested for starch, and should this be present, the temperature is raised 1° every two minutes until it has completely disappeared. After cooling, water is added to make 450 Gm. total contents. After thoroughly mixing, the mass is thrown upon a plaited filter, but the first half of the filtrate is thrown back once more upon the filter. After collecting as much as possible of the filtrate, its specific gravity is taken by means of the Westphal balance. From this gravity the percentage given by Schultze's table is ascertained, and that number multiplied by 8.75, which gives the percentage of dry extract from the malt. The author has experimentally proved that the extract cannot be accurately determined by evaporation and drying at 105°, owing to the serious decomposition of maltose at that temperature. This, of course, applies to the estimation of extract in beers. Drying the extract at 70–75° is impracticable, except for scientific purposes.—Jour. Amer. Chem. Soc., 1894, 353.

Extract of Nux Vomica.—E. W. Lucas recommends the following process of preparing extract of nux vomica, as being more economical and as yielding a product of firmer consistence: Macerate 1 lb. av. [453.6 Gm.] of nux vomica (in fine powder) for 4 days in 2 pints [946 C.c.] of chloroform water to which 2 fluid ounces [59 C.c.] of acetic acid have been added. Continue percolation by adding more chloroform water, until a gallon has been collected. Evaporate the percolate at a low temperature to 4 ounces av. [113.4 Gm.] and add ¼ ounce av. [7 Gm.] of glycerin toward the end of the operation. The alkaloids are then determined in

the customary manner, and the extract is brought to the required standard. Of course, if a dry extract is desired, the glycerin is omitted and the evaporation continued over a water-bath as far as possible. Powder the dried product rapidly and bring it to the strength required by admixing it with sufficient liquorice or some other inert substance. The finished product should be preserved in small and hermetically sealed vials.—Pharm. Jour. Trans., 1894, 137.

Fluid Extract of Wild Cherry.—From experiments made by Galen, Jr., (Am. Drug and Pharm. Record, XXVI, 135), it appears that a fluid extract of wild-cherry bark, made by percolating the bark, in No. 30 powder, with a menstruum of alcohol, 1 part; glycerin, 1 part; and water, 2 parts, gives a better product than when made by the U. S. P. process. The author first moistens the drug with water, places it in a closed vessel, allows it to stand for 12 hours, and then percolates with a menstruum composed as above indicated. The author employed the process of repercolation in his experiments.

Fld. Ext. of White Pine Compound.—J. G. Kennedy (West. Drug., 1895, 175) recommends:

Wild cherry bark	52 ounces (av.)
White pine shoots or bark	52 ounces (av.)
Bloodroot	6 ounces, 402 grains.
Spikenard	7 ounces (av.)
Balm of Gilead buds	7 ounces (av.)
Sassafras bark	3 ounces, 201 grains.
Glycerin	10 fluidounces.

The pine must be cut into small pieces, then thoroughly contused in a clean, iron water, then carefully dried in a drying chamber. It is now mixed with the wild cherry bark, spikenard, blood-root and sassafras, and then reduced to a No. 30 or 40 powder. Place the balm of Gilead buds in the iron mortar and add some of the foregoing powder by degrees and reduce to a No. 30 powder. Mix the two powders thoroughly. Mix the glycerin with 112 fluidounces of water and measure out 40 fluidounces for immediate use and 24 fluidounces for future use, adding what is left to 13 pints of alcohol. Take 5 pounds of the powder, moisten it with the 40 ounces of water and glycerin, and set aside in a warm place for 24 hours. When ready add enough of the alcoholic menstruum to moisten sufficiently; pack firmly in a cylindrical percolator and add enough of the menstruum to leave a stratum above the drug. Let stand for 48 hours; then begin percolation. The flow should be quite slow and regular, the remainder of the alcoholic menstruum being gradually added. Reserve the first 4 pints of the percolate and mark "Finished Fluid Extract." The next 4 pints passing mark "Exhaust A." Let the percolation proceed until complete and then return the percolate to the drug and let it run

through again. This last procedure is not necessary, but it will insure more complete exhaustion. Divide the percolate as it comes through this time, labeling the first 3 pints "Exhaust B." and the remainder "Exhaust C." Pour on 4 pints of dilute alcohol. When this has passed mark it "Exhaust D."

Take the 3 pounds of powder that was left and moisten it with the 24 ounces of glycerin and water reserved and let it stand for 8 or 10 hours. This should be done before the percolation of the first batch is finished and sufficiently early to give it 48 hours to macerate in exhaust "A," and add enough exhaust "A" to pack as before. Then add the rest of "A" and let it stand 48 hours. Allow percolation to proceed as before, add exhaust "B" slowly, reserving the first 3½ pints of percolate and mark it "Finished Fluid Extract." Add exhaust "C" and when it disappears, add "D." When percolation has stopped take the percolate and evaporate on a water-bath in a graduated dish to 6 or 8 fluidounces. After cooling somewhat, add enough of the finished fluid extract to assist in removing the extract from the warm dish into a gallon measure. Finally add the remainder of the fluid extract and enough dilute alcohol to make 8 pints of the finished preparation.

Animal Extracts.—C. E. Stuart (Chem. and Drug., 1894, 198) points out that healthy animal tissues (being aseptic extracts which could be safely used) could be prepared if scrupulous attention were paid to cleanliness and antiseptic conditions. The knives and forceps used were to be sterilized by heat; glass and other vessels, as also the hands of the worker, by washing with 5 per cent. carbolic acid.

Thyroid Extract.—The glands, best cut personally from the freshly-killed sheep freed from cysts (of fatty, not purulent matter), and non-hypertrophic, were cleaned from fat, etc., sliced thinly, bruised and for every lobe 1 C.c. of glycerin and 1 C.c. of sterilized water added. After standing twenty-four hours the dull-red, thick liquid was strained off through fine calico. For hypodermic use, water with 0.5 per cent. of carbolic acid was substituted for the plain water. A powder of good keeping qualities could be made by drying the expressed juice mixed with sugar of milk on glass plates.

As regarded the active principle of the thyroid gland, the author agreed with Gourlay that there were present nucleo-albumen, but very little proteid, no mucin, proteose nor peptone. At the same time he doubted the possession of any peculiar virtue by the nucleo-albumen. In accordance with the suggestion of G. Murray, the author made an aqueous extract of 100 lobes, previously digested for weeks in absolute alcohol; the extract evaporated under reduced pressure at 30° C. was poured into 10 vols. of absolute alcohol, the precipitated substance again extracted with water and reprecipitated. The final product weighed 0.792 Gm., and experiments upon its activity were being carried out by Murray.

Brain Extract.—The sliced and bruised brain of rabbits (weighing 7.3 to 11.7 Gm.) was mixed with 1 C.c. of glycerin and 1 C.c. of ½-per cent. carbolic acid per Gm., and after twenty-four hours' digestion strained with strong pressure through linen. The pinkish-white emulsion (sp. gr. 1.087) had been injected with good effect in neurasthenia, locomotor ataxy, and other nervous cases. It contained a little dissolved proteid and suspended protagon, lecithin, cholesterin and cerebrin. Althaus (Lancet, December 2, 1893) suggested that its action was due to its nature as a highly specialized pabulum of nervous matter, and to the decomposition of lecithin and protagon by the alkali of the blood yielding chlorine and fatty acids.

Spinal Cord Extract.—The cord (average weight, 4.68 Gm.) obtained by cutting away the vertebræ and removing the arachnoid, was treated as the brain extract. Althaus had termed the product "Myeline alpha."

Spleen Extract.—The position of the organ was described (behind and across the stomach), its size given as 1½ to 2½ inches long and ⅛ to ⅜ inch diameter, and average weight as 0.89 Gm. Each organ was rubbed with enough glycerin and ½-per cent. carbolic acid (equal parts) to make 1 fl. dr. of extract, which had been used hypodermically (dose 10 minims) in leucocythemia, enlarged spleen, and Hodgkin's disease.

Suprarenal Extract.—The average weight of the suprarenal capsule was given as .25 Gm., and bruised in a mortar it had a yellowish-brown granular appearance. Prepared similarly to the preceding, the extract was used (dose 10 minims) in Addison's disease.

Pituitary-Body Extract.—The small pink mass at the base of the brain (average weight .75 Gm.), free from membrane, was treated as the brain and used in acromegaly.

Pancreas Extract.—The pancreas of the pig, carefully freed from fat, finely divided, and treated like brain extract, furnished a milky product.

Thymus Extract.—The gland from a young sheep or pig treated as the brain, yielded a thin whitish extract, used in similar cases to the thyroid, but without much effect.

Kidney Extract.—The finely-chopped kidney, free from excretive matter, was treated like the brain.

Bone-Marrow Extract.—On the hypothesis that red blood-corpuscles are chiefly developed in the red marrow of bones, an extract was prepared from the cancellous portion of the bones of the head and femur of the calf, macerating the mass for a few days in 10 vols. of glycerin, and filtering through glass.

Orchitic Fluid.—Sheep's testicles, deprived of outer membranes, macerated twenty-four hours in glycerin and boric acid (3 C.c. and 6 C.c. of a 5 per cent. solution to each Gm). The mixture was filtered through sterilized paper, and finally sterilized.

Preparation of Thyroid Extract.—Willy Sieck gives the following method for the preparation of extract and pills of the thyroid gland. Take the fresh thyroid glands of the calf or the sheep, free carefully from fat and membranous tissue, chop fine and macerate with glycerin (2 parts of glycerin to 1 of thyroid) at the ordinary temperature for 24 to 26 hours. If allowed to stand either a longer or shorter time the yield, curiously, is less. Express with a hand press and to the liquid obtained add alcohol until no further precipitation occurs. Throw this precipitate on a filter placed in a funnel, the nose of which is fitted with a rubber tube bearing a pinchcock. After washing out the glycerin thoroughly by means of alcohol, close the tube, pour a little more alcohol and ether on the precipitate, put the moist precipitate into a porcelain evaporating dish and add a weighed quantity of infusorial earth, mix well and allow the alcohol and ether to evaporate. By deducting the weight of the infusorial earth added from that of the finished product, the exact quantity of extractive present can be determined. The extract thus obtained is almost entirely odorless. The use of powdered vegetable substances, as liquorice, instead of the infusorial earth is not advisable, as a leathery mass is the result. The alcohol used can be recovered by distillation and used repeatedly. By addition of powdered althæa and liquid extract of liquorice pills may be readily formed. (Pharm. Zeit., 1894, p. 428.) Thyroid glands are made into pills by Benzon, by the following method: The glands are freed from grease and enveloping membranes, then finely divided, spread in thin layers on plates, and dried in a stove, at a temperature between 40° and 50°. When desiccation is complete the matter is powdered, then washed with ether to remove any remaining traces of fat. Finally, the powder is massed with simple syrup, and the pills when cut are rolled in cocoa to mask the odor of the glands.

Caution in the Use of Animal Extracts.—The editor of the Medical Record writes: "In a previous issue, reference was made to beneficial results having been noted in a case where the injection of a preparation of the supra-renal capsule was used for curative purposes. We therefore consider it our duty to draw the attention of our readers to recent researches, made in England by Oliver, which point to a great danger attending the use of such remedies. We are indebted to Addison for the first hints regarding the connection between certain diseases which always proved fatal, and certain conditions discovered in the supra-renal capsule after death; but it was Brown-Sequard who first demonstrated that the total removal of these bodies had a fatal result, accompanied by an alteration in the blood which rendered that fluid poisonous to other animals. More recently Oliver has discovered that, in both alcoholic and watery extracts of the supra-renal capsule, a most potent substance is produced. If only as much as a grain by weight of this organ be extruded with alcohol and allowed to dry, and then be re-dissolved in a little water or salt

solution, the most extraordinary results will follow if this fluid is injected into the blood of a dog. It will raise the pressure of the blood within the arterial system to an enormous extent, so that, from a blood-pressure which would be sufficient to balance a column of some four inches of mercury, the pressure may rise so high as to be equal to a column of mercury of twelve or more inches, such result being obtained by a very minute dose. As Oliver states, we have here to do with a substance as potent, although in a different direction, as strychnine. These facts clearly point to the conclusion that the whole subject must be investigated further before such remedies can be administered without the greatest caution."—Drug. Circ., 1895, 83.

GAUZES.

Assay of Medicated Gauzes.—Dupuy (Mont. Pharm. Jour., 1894, 275) gives the following methods for the assay of gauzes and antiseptic dressings:

Borated Gauze—A small quantity of the gauze is extracted with alcohol which is then ignited; it should burn with the characteristic green flame of boric acid.

Assay.—According to the experiments of Barthe, the best solvent for boric acid for this purpose is diluted glycerin 5 per cent., used at the ordinary temperature. This solvent permits of exact volumetric titration, using decinormal solution of potassium hydrate and phenolphthalein. Alcohol should not be used, as the end reaction is not so sharp.

The reagents to be employed are the following:

1. *Solution of Phenolphthalein.*

Phenolphthalein	1 gm.
Diluted alcohol	100 "

2. *Decinormal Solution of KHO.*

This should contain 5.6 Gm. KHO to the litre and each Cc. is equivalent to 0.0062 gr. of boric acid.

Take 1 Gm. of the sample, taking care not to pick it out, as some of the acid might thus be lost, and treat it with the diluted glycerin 5 per cent.; to the solution add 6 drops of the indicator, and add the potash solution drop by drop from a burette, till a faint violet color is produced, which denotes the end of the reaction. From the number of C.c. of solution used the percentage of boric acid is then calculated; for example, it requires 15 C.c. of the solution of potassium hydrate to saturate the boric acid in a sample of cotton; what is the quantity of boric acid contained in the sample?

10 C.c. of solution saturate 0.062 of boric acid.

1 C.c. = 0.0062
15 C.c. = 0.093

1 Gm. therefore contains 0.093 of boric acid and 100 Gm. contains 9.3, or 9.3 per cent.

Salicylic Acid Dressings.—If a piece of salicylic gauze or cotton be touched with a glass rod dipped in dilute solution of ferric chloride, it produces the characteristic violet coloration.

Assay. As salicylic acid is but slightly soluble in water, it is necessary to use the fluid in which it is most soluble, namely, ether. A definite weight of the cotton is treated with ether till the acid is entirely dissolved. After evaporation or distillation of the ether, the residue is weighed as salicylic acid.

Iodoform Gauze.—Iodoform gauze is easily recognized by its color and odor.

Assay.—A known quantity of the dressing is extracted with ether, which on evaporation in a water-bath leaves the iodoform behind.

Salol Dressings.—These also, in the treatment with diluted solution of ferric chloride, give a violet coloration.

Assay.—A known quantity is extracted with ether, which, after evaporation, leaves the salol.

Mercuric Chloride Dressings.—If a previously moistened sample be treated with the reagents for mercuric salts, the characteristic reactions should be produced.

Assay.—These dressings may be volumetrically estimated by Personne's method, which depends upon the following principle: When to a solution of mercuric chloride a dilute solution of potassium iodide is added, potassium chloride and a double iodide of mercury and potassium are formed, which dissolve to form a colorless solution, till one-half the potassium iodide has been used by the mercuric chloride, when the further addition of this compound produces a slight persistent precipitate of mercuric iodide.

The potassium iodide solution is prepared by dissolving 3.32 Gm. of the salt in sufficient distilled water to produce 1 litre, 10 C.c. of this solution saturate 0.013 Gm. of mercuric chloride. 10 Gm. of the dressing are treated with two portions of 200 C.c. of water containing some sodium chloride (to facilitate the solution of the mercuric salt). The solution is then filtered, and to 100 C.c. the solution of potassium iodide is added from a burette, till the red precipitate formed remains undissolved. From the quantity used the proportion of chloride is then calculated.

GELATINS.

Plastic Gelatins.—Under this name, M. Dané, chemist and pharmacist at Valence-d'Agen, designates (Union Pharmaceutique, xxxvii., 52) a series of magistral preparations, easy to prepare, intended as the excipient of exceedingly active remedies (or others, if desired). The base is gelatin, glycerin and water, proportioned as follows:

Gelatin (in colorless leaves)	15 parts.
Glycerin (30°)	50 parts.
Distilled water	60 parts.

Melt together in the water-bath, and before the mass sets add the medicinal agent in the dose desired, then pour out on the slab or in moulds.—Nat. Drug., 1895, 109.

GLYCERITA.

Glycerite of Ferric Chloride.—A non-alcoholic preparation under this name on the market is represented by the manufacturers to contain 60 drops of tincture of ferric chloride in each fluidounce. Based upon an examination of this preparation, F. A. Sieker communicates to the Monatsblatt des New Yorker Deutschen Apotheker-Vereins (May, 1895?) the following process for such a glycerite: Mix 240 minims (15 C.c.) of solution of ferric chloride, U. S. P., with 13 fluidounces (390 C.c.) of glycerin; dissolve 80 grains (5 Gm.) of citric acid in 1 fluidounce (30 C.c.) of water, and mix the two solutions. Then add enough ammonia water until the liquid is but feebly acid. This will require about 500 minims (33 C.c.). Lastly dilute with water to 16 fluidounces (480 C.c.), and mix well. If twice as much citric acid is employed, a greenish instead of a brown liquid will result. Each fluidounce of glycerite, prepared by this method, represents the equivalent of 60 minims of tincture of ferric chloride. The iron is, however, not present as chloride, but as a soluble citrate, and the chlorine as ammonium chloride.—West. Drug., 1895, 238.

Lanolin Glycerite.—In the Amer. Drug. and Pharm. Rec., 1895, 141, the following is given:

Glycerite of starch	℥ iij.
Lanolin	℥ j.

Rub the lanolin with a small portion of the glycerite until thoroughly mixed, then add the rest gradually, rubbing thoroughly after each addition. By being careful an elegant emollient is obtained, forming one of the best glycerin preparations that can be made. Perfume to suit.

Glycerite of Soap.—Heat 92 parts of glycerin in the water-bath, and add, stirring constantly 8 parts of finely powdered medicinal (castile) soap; allow to partially cool and then pour into molds. After standing four or five hours take out of the moulds, wrap in tin foil, or, preferably, in waxed paper, put into a wide-mouthed bottle, cover tightly and keep in a cool place. This preparation is said to be very valuable as a suppository base, and to be, in its simple form, of use in the treatment of children as a substitute for a glycerin enema.—Apoth. Zeit., 1894.

INFUSIONES.

Infusions.—Wm. Lyon has made an excerpt from Martindale's analysis

of 12,000 prescriptions, and gives the following table showing how reduction of time affects the amount of extraction yielded by the infusions:

	Grains of Dry Extractive in one fl. oz. of Infusion After Standing.		
	¼ hour.	½ hour.	1 hour.
Buchu (B. crenulata)	5.5	6	
Caryophyllus	3.5	4	
Cascarilla	5	5.5	
Catechu	1.2	13.5	
Ergot	1.5	2	
Gentian Comp.	6	6	
Jaborandi	7	7	
Krameria [bark]	2.5	3	
Lupulus	6	6.5	6.5
Matico	4	4	
Rheum	4.5	4.5	
Serpentaria	2	2	
Uva Ursi	8	8	8
Valerian	3	3	3

The shortening of the time made no difference in the color or the aroma of the infusion, with the exception of gentian.—Pharm. Jour. Trans., 1895, 868.

Infusion of Senna.—W. Moore (Brit. and Col. Drug., 1894, 575) had noticed deposits when dispensing tartarated soda and sodium phosphate with the infusion of senna. These turned out to be mainly calcium tartrate and phosphate. It was concluded that there was double decomposition between the sodium salts and the organic salts of the calcium in solution in the infusion (calcium cathartate, &c.), and, therefore, the medicinal quality was not impaired by the change.

LINIMENTA.

Soap Basis for Liniments.—F. W. Lucas suggests that a useful preparation for a soap basis for liniments may be made according to the following formula:

Curd soap, in fine shreds	4	oz. tr.
Soft soap	1	"
Glycerin	2	fl. oz.
Distilled water	enough to make 1½	lbs. av.

Dissolve the soaps in 16 fl. oz. of the distilled water with gentle heat, add the glycerin, and enough distilled water to bring the total weight of the strained product up to 1½ lbs. avoirdupois, and allow to solidify. Such liniments, it is supposed, will be more readily absorbed by the skin than other preparations, and are altogether cleaner and more easily applied.—Pharm. Jour. Trans., 1894, 242.

Iodine Liniment.—J. J. Annery makes a solution of iodine in oleic acid. It is claimed that it will not stain, and is readily absorbed by the skin.—Jour. Soc. Chem., Ind., 1894, 836.

Linimentum Saponis.—F. Hemm (Amer. Jour. Pharm., 1894, 390) says it is best to digest the soap with the water in U. S. P., 1880, until a translucent jelly results, then dissolve it in the alcoholic solution of camphor and oil rosemary. Taking 8 Gm. of dried soap in fine powder in place of 10 Gm. of fresh or moist soap in shavings for 100 Gm. of product, is an improvement, because it insures a uniform quantity of soap in solution, and the amount usually remaining in solution at our average store-room temperature. Soap in shavings as formerly directed varies very much in the amount of water which it contains, and therefore is not uniform.

Turpentine Liniments—Potassium Stearate in.—T. C. J. Bird recommended the following for Lin. Terebinthinæ:

Oil of turpentine	16	fl. oz.
Camphor	1	fl. oz.
Stearic acid	80	grains.
Solution of potash	½	fl. oz.
Distilled water	1½	fl. oz.

Melt the stearic acid with a little of the turpentine in a water-bath, and add to the remainder, in which the camphor has been previously dissolved. Mix the solution of potash and distilled water in a bottle of sufficient capacity, add the turpentine solution, and shake vigorously for a few seconds. The result of this formula is a milk-white liniment, which is always of uniform consistence, and does not separate. The advantage of employing definite materials. as liquor potassæ and stearic acid, in place of the sapo mollis of the present official formula, with its varying percentage of water and free alkali, is obvious, ensuring as it does a liniment which is always of uniform consistence and appearance. The small quantity of stearic soap required to effect the emulsification of turpentine, and the ease and rapidity with which the liniment can be prepared, are additional points in favor of this formula. One grain of stearic acid requires about 3 minims of liq. potassæ for neutralization. This corresponds to the formation of the neutral potassium stearate, and is the proportion which succeeds best with ol. terebinthinæ.—Pharm. Jour. Trans. 1894, 158.

LIQUORES.

Solution of Chloro-Phosphid of Arsenic.—F. A. Sieker has examined a preparation of this kind put upon the market, and from his analysis concludes that a similar preparation may be made by dissolving 2 Gm. of arsenous oxide in 92 Gm. of diluted HCl and 200 C.c. of water with the aid of heat, and after cooling diluting to 1000 C.c., and adding a few drops of phosphoric acid.—Pharm. Rund., 1895, 16.

To Obviate the Ammoniacal Odor of Bromide Solutions.—Ducung (Rép. de Pharm., 1894, 306) states that whenever a solution of the three usually employed bromides (of potassium, sodium and ammonium) is prepared in the cold, the liquid obtained disengages a distinctly ammoniacal odor; and it is easy to demonstrate the presence of free ammonia by means of a glass rod moistened with Nessler's reagent. The same phenomenon is produced by bringing an ammoniacal salt into contact with alkaline iodides or with strontium bromide and iodide. The disengagement of ammonia is evidently due to the alkalinity of the bromides or iodides employed.

According to the author's investigations, the quantity of ammonia is very slight, and the therapeutic value of the medicaments is but slightly diminished. To obtain solutions not disengaging an ammoniacal odor, he dissolves the salts in a small quantity of distilled water, and brings this concentrated solution to ebullition for a minute. The volume of the solution is then made up with the remainder of the water prescribed.

Liquor Ferri Albuminati, Gramm.—Groot (in Nederl. Tijdschr. vor Pharm. Chem. u. Tox., June, 1894; Pharm. Centralh., 1894, 549), gives the following formula:

Liquor Ferri Albuminati (Dialys.)	30.0
" " oxychloridi	10.0
Aqua Destillata	50.0
Spiritus Menthæ piperitæ	10.0

Solution of Ferric Chloride.—H. G. Beck examined 10 samples with the following results:

Sample No.	Percentage Fe_2Cl_6.	Percentage free HCl.	Specific Gravity.	HNO_3.	Ferrous Salt.
1	37.46	1.29	1.397	slight.	none.
2	37.57	.85	1.399	slight.	"
3	36.20	2.03	1.387	decided.	"
4	37.85	1.04	1.405	slight.	"
5	38.83	1.41	1.406	much.	"
6	38.41	.00	1.402	much.	"
7	35.82	.60	1.367	much.	"
8	38.71	1.35	1.407	slight.	"
9	34.82	3.19	1.386	trace.	"
10	33.83	.84	1.340	none.	much.
Average	36.95	1.26	1.390		

—Amer. Jour. Pharm., 1894, 323.

Sterilization of Morphine Solution.—A. Berlioz (Jour. Pharm. Chim., 1894, 410), has found unaccountably sudden changes in his solution of morphine chloride during sterilization. After a number of experiments

and observations, he has determined that the alkali of the glass is often the cause of the difficulty. He believes to be successful one should use a glass which yields the least trace of alkali, and also a temperature not quite 110° should be employed. As soon as this temperature is reached the darkening takes place very rapidly. When the alteration commences to take place in the cold, and the glass is not alkaline, then the difficulty probably lies in the impurity of the morphine salt.

Preservation of Sublimate Solutions.—L. Vignon (Jour. Pharm. Chim., 1894, 111). Continuing his work on this subject, the author points out that the decomposition of sublimate solutions is principally due to the alkaline substances in the water employed or in the glass of which the recipients are formed, a limited quantity of such alkaline matter sufficing to cause the precipitation of a relatively considerable amount of mercury. On the other hand, hydrochloric acid and alkaline chlorides increase the stability of such solutions, the first by saturating the alkaline precipitants, and the chlorides by their solvent power.

As the result of a series of experiments, he finds that ammonium chloride prevents precipitation by ammonia or albuminoid matter in the water, but fails to prevent the action of soda or sodium carbonate. Sodium chloride, on the other hand, fails in the case of ammonia and soda, but prevents precipitation by sodium carbonate and albumin. By combining the chlorides of ammonium and sodium, therefore, precipitation by any of the substances mentioned is prevented, as well as by hydrochloric acid. The two formulas recommended are as follows:

I.

Mercuric chloride	1 Gm.
Ammonium chloride	20 Gm.
Sodium chloride	10 Gm.
Distilled water	1 litre.

II.

Mercuric chloride	1 Gm.
Hydrochloric acid (22° Be.)	1 C.c.
Distilled water	1 litre.

Stability of Aqueous Solutions of Mercuric Chloride.—E. Burcker.—Aqueous solutions containing one part of mercuric chloride and 1.14 parts of hydrogen chloride per litre of ordinary water (containing calcium carbonate) undergo only trifling alterations when exposed to air and light, and no alteration at all when kept in well closed vessels in the dark. 0.5 Gm. of tartaric acid per litre has the same effect. Indigo-carmine has no decomposing effect on solutions of mercuric chloride in distilled water acidified with tartaric acid, even when they are exposed to light.—Compt. rend., 1894, 340.

Stability of Aqueous Solutions of Mercuric Chloride.—E. Burcker has

made observations similar to those of Vignon and Tauret on the stability of aqueous solutions of mercuric chloride containing one part of the salt per 1000. He finds that ordinary spring water causes immediate decomposition of the mercuric chloride, and this decomposition continues under the combined influence of air and light, and the inorganic and organic substances contained in the water and in the air. Decomposition stops or becomes insignificant when the liquid is removed from the action of air and light. Solutions of mercuric chloride, prepared by means of pure distilled water, alter to only a very minute extent, even when exposed to air and light.—Compt. rend., 1894, 1345.

Influence of Animal and Vegetable Fibers on Sublimate Solutions.—Numerous studies have been made of recent years on the influence of cotton on sublimate solutions, and it has been observed that even the purest cotton wool exerts some disturbing influence on sublimate solutions. If, for instance, successive portions of cotton wool be impregnated in the same solution, the results obtained will differ widely in the different lots of cotton. Sclavo and Manuele have recently made further studies of this subject, which they report in L'Orosi, 1894, 10. It seems from their statements that in Italy solutions of mercuric chloride are used for disinfecting household linen and clothing. Their investigations showed that after repeated use, a 3 per cent. solution of mercuric chloride contained but 0.086 per cent. of the salt. Fibers of animal origin (wool and silk), have a strong decomposing influence, 100 Cc. of a 5 per cent. solution losing all of its mercuric chloride solution by precipitation within twenty minutes when 15 Gm. of wool is added. Additions of chloride of lime or of hydrochloric acid do not affect this action. Vegetable fibers, however, have much less effect upon the sublimate.—Amer. Drug. and Pharm. Rec., 1894.

Action of Gelatin on Solutions.—Mills and Sawers find that the introduction of gelatin into saline solutions results in the combination of the salts with the gelatin. Chrome alum (potassic) appeared to be taken up unaltered, the resulting compound being quite insoluble in boiling water; but it was slowly dissolved at a gentle heat by an equal weight of acetic acid diluted with about twice its weight of water, the solution leaving an insoluble residue when it dried up. Alumina alum (potassic) was absorbed by gelatin to form a compound, which dissolved slowly in boiling water; nickelous sulphate gave a partly soluble gelatin; cobaltous sulphate a completely soluble one; and cupric sulphate a partly soluble compound. —Journ. Soc. Chem. Ind.; Canad. Drug., 1895, 137.

Fowler's Solution, as is known, deposits a sediment after some days, composed of silicic acid originating from the action of potassium carbonate on the glass. Garraud now recommends (Journ. de Pharm. d'Anvers., 1894, vol. i, p. 394) normal potassa solution, a liquid of constant alkalinity, in place of the hygroscopic carbonate, which, besides, is

not always of the same purity. He prepares Fowler's solution by agitating 10 Gm. of arsenous anhydride with 145 C.c. of normal potassa solution; when solution has taken place, he filters and adds 815 Gm. of distilled water and 30 Gm. of compound spirit of balm.

MEL.

Mel Crudum.—For obtaining the specific gravity, 50 Gm. are dissolved in 100 Gm. of water, the solution filtered through a crude filter, and the sp. gr. obtained by the Mohr's balance at 15°.—Pharm. Centralh., 1894, 610.

Improved Honey of Roses.—As is well known, honey of roses deposits glucose upon standing even but a short time. Touflet ("Pharm. Centralh., xxxvi, 307) obviates this precipitation in the following manner:

Take

Powdered Rose Leaves	25 parts
Alcohol, sp. gr. 0.875	75 "
Honey	80 "
Sugar	34 "

Exhaust the rose leaves with the alcohol, filter and distill off the filtrate to 40 parts. To this add the honey and sugar, and bring to the boiling-point.

MISTURÆ.

Basham's Mixture.—J. E. Groff gives the following: To the solution of ammonium acetate add a few drops of acetic acid and shake. If effervesence ensues continue adding acid, shaking until it entirely ceases. Then, or at first if no effervesence occurs, add the tincture of ferric chloride, previously diluted with twice its volume of water and allowed to cool. After shaking add the aromatic elixir, the glycerin and enough water to make the required quantity.—Drug. Circ., 1894, 267.

A. C. E. Anaesthetic Mixture.—J. W. England (Amer. Jour. Pharm., 1894, 328), in a Review of Martindale's Extra Pharmacopoeia, comments on the following: "The A. C. E. Anæsthetic Mixture" of alcohol (specific gravity 0.838) 1 volume, chloroform specific gravity (1.497) 2 volumes, and ether (specific gravity 0.735) 3 volumes, that found favor in this country a few years ago, has been condemned by surgeons, on the ground that its rate of volatilization is unequal, so that the anæsthetized patient is subjected to varying vapors, and not to an anæsthetizing vapor of uniform composition. It is claimed that this fault may be obviated by employing absolute alcohol and ether of specific gravity 0.720 instead of 0.735. This latter mixture is alleged to be safer than chloroform, and quicker in action than ether, though not so quick as chloroform.

MUCILAGINES.

Improved Mucilage of Sassafras Pith, according to J. W. England (Am. Jour. Pharm., 1894, 350, may be made by beating the pith, in a wedge-

wood or porcelain mortar, with a small quantity of sterilized water until it gets pasty, expressing through cheese-cloth, returning the residue to the mortar, adding more of the water, and continuing as before. In this way, in a short time, a dense and syrup-like mucilage may be had, it is stated, very different in physical appearance from the watery product obtained by following the official directions of simple maceration in water for three hours and straining.

PAPIER.

Papier Gautier.—Gautier has introduced a "papier à l'iode naissant" (nascent iodine paper) which, when moistened and applied to the skin, evolves free iodine. For this method of applying iodine the inventor claims various advantages. Examined by Polak, this paper was found to be an ingenious adaptation of the well-known method of determining iodine in iodides by adding an iodate and an acid, and then estimating the iodine liberated by means of a thiosulphate. Papier Gautier consists of three sheets of white filtering paper (11 x 17 cm.) held together in places by chrome-gelatin glue. These are wrapped in gutta-percha tissue, and the whole enclosed in an envelope. The gutta-percha is merely for protection. On being dipped into water the combination sheet quickly turns brown and emits the odor of iodine. According to Polak the three sheets of paper approximately contain respectively 0.340 Gm. of potassium iodide, 0.085 Gm. of potassium iodate, and 0.340 Gm. of potassium bisulphate. While lack of material prevented a determination, it is probable that the solutions of the iodine salts also contain a slight amount of sodium thiosulphate as a precaution against discoloration of the papers. The author describes various precautions to be observed in order to insure good results.—Pharm. Centralh., 1894, 549, Apoth. Zeit., 1894, 500.

PASTILLES.

Phosphorus-Chocolate Pastilles.—Rosenberg (Pharm. Ztg., xl., 231) recommends the following method for preparing chocolate pastilles containing phosphorus: A weighed quantity of phosphorus is dissolved in a weighed quantity of melted cacao butter; the solution is filtered and mixed with powdered sugar and powdered cacao deprived of its oil, and spiced if desired, or it may be mixed with a chocolate paste from which a part of the oil has been removed. The mixing and massing are done in a moderately warm mortar. After the pastilles have been formed, they should be suitably coated, and then dipped into a paste of pure chocolate. The pastilles should be made to contain each $\frac{1}{4}$ milligramme ($\frac{1}{250}$ gr.). One or two are the daily dose for a child.

Danger of Sublimate Pastilles.—Henning draws attention to the similarity of appearance between sweetmeats and sublimate pastilles as being a probable source of danger, and mentions a case in which he was called upon to examine an article supposed to be sweetmeat which turned out

to consist of mercuric chloride and common salt.—Pharm. Jour. Trans., 1894, 73.

PENCILS.

Zinc-Alum Pencils.—Pencils of zinc sulphate and alum are prepared as follows: The desired quantity of powdered alum is first moistened with a few drops of water, and in a porcelain capsule is submitted to gentle heat, under constant stirring, until the alum is melted. When this occurs, the desired quantity of zinc sulphate is added all at once, and the heat is continued until the melting point is reached, stirring being constantly maintained. The metallic moulds should meanwhile be warmed and oiled, and as soon as the mixture of zinc sulphate and alum has become quite limpid it should be poured into them. Let the moulds cool spontaneously, and as soon as they are cold the pencils are removed, dropping out quite easily. If left exposed to the atmosphere for even a little while, these pencils become brittle and drop to pieces, and it is, therefore, best to drop each pencil in a glass tube and hermetically seal the same, either by melting the ends in the lamp, or by any other available means.—Rundschau (Prague); Nat. Drug., 1895, 80.

PEPTONATES.

Preparation of Peptonates.—Much has been written about the preparation of peptonates of iron and manganese, H. Bremer says in the Pharmaceutische Wochenschrift, most of which practically is worthless for pharmacists. All methods and formulas are based on the assumption that the peptones of commerce, with which the writers have operated, are of definite composition. Nothing could be further from the truth. Most commercial peptones are nothing but albumoses and albumins containing not even one per cent. of peptone, while the others vary in peptone strength from one to sixty per cent. But rarely one meets a peptone of higher percentage than the latter figure, while absolutely pure peptone seems to be but a most recent acquisition. This fact serves to explain the conflicting reports of different writers concerning the results obtained by them. The author had intended to do some original research work on the manufacture of true peptonates by various methods, but finding himself unable to carry out these designs, he urges others to take up this work, and, to forestall the possible covering of desirable methods by patents, he mentions the following available methods for preparing peptonates: (*a*) Bring together solutions of true peptones or of preparations containing peptones and metallic oxides, metallic oxyhydrates, or metallic salts; (*b*) precipitate the peptone compound by means of salts, oxides, or hydroxides from the ammonium sulphate solution employed for separating the albumoses from peptonic solutions prepared by means of any known process.—West. Drug., 1895, 60.

PILULÆ.

Simple Pill Counter.—Buwa gives suggestions by which a simple pill counter can be obtained by making a shallow tray in the shape of an isosceles triangle. If the pills are thrown into the tray and shaken to the apex the first row in the apex will contain one pill, the second two, the third three, and so on. The number of pills on the tray can therefore easily be ascertained by counting the rows and referring to a previously calculated table.—Pharm. Post., 1895, 237.

Smaller-sized Pharmacopœial Pills.—Wm. Lyon. In endeavoring to reduce the size of the pills several well-known and otherwise satisfactory excipients have to be set aside, as too large a bulk of them is required to give a satisfactory mass. Thus confection of roses, confection of hips, treacle, glycerin of tragacanth and glucose, are ineligible and search has to made for suitable substitutes. In the case of glycerin of tragacanth the objection is removed by increasing the quantity of glycerin 25 per cent. This modification of the B. P. formula gives a most useful excipient. This would not apply to the U. S. P. pills, as the excipient used in preparing them is, in most cases, soap and water or syrup, thus reducing the size of the pills to their minimum. The changes which the author proposes that are equally applicable to the U. S. P. pills are the following: Pills of Aloes might be made with aloin instead of aloes, half a grain only of the former being necessary to equal two grains of the latter in remedial activity; the quantity of soap could then also be reduced. Pills of Aloes and Asafetida might be reduced in size in the same manner, by substituting aloin for aloes, and reducing the quantity of soap. In pills of Aloes and Iron the quantity of aromatic power might be reduced, and aloin employed instead of aloes. Pills of Aloes and Myrrh, and Compound Pills of Rhubarb, could also be made to contain aloin in the place of aloes.—Pharm. Jour. Trans., 1895, 1031.

A New Pill-coating.—Waldstein (N. Y. Med. Journ., 1894, vol. xl, No. 10) has obtained a new pill-coating for medicines which are to pass the stomach without being dissolved, from a mixture of shellac and salol dissolved in alcohol. With the view of determining the behavior of such pills, he has given methylene blue in the pills, and has found by washing out the stomach that they remained undissolved there, whereas after taking them the fæces and urine became colored. Small doses of intestinal cathartics acted more promptly when administered in this way than in the usual manner. Waldstein proposes, by administering antiseptic remedies in this way, to give them a thorough trial in some cases of eczema and urticaria, etc., due, he thinks, to intoxication from ptomaines formed in the intestinal canal.

Improved Blaud's Pills.—J. W. England stated at the meeting of the Pennsylvania Pharm. Assoc. (1894) that the usual formula for Blaud's pills —iron sulphate, potassium carbonate, tragacanth and glycerin—may be

considerably simplified and made to yield a more permanent product by modifying it so as to conform with the following formula:

Potassium carbonate	⅓ grain.
Potassium sulphate	2 "
Mass of iron carbonate	3 "

For 1 pill.

Little or no excipient is said to be required. The pills flatten slightly on keeping, and are therefore best dispensed in capsules. They are not prone to harden or become reddish-brown, or fracture, as are those made according to the old formula.

Copaiba Pills.—W. Rollo remarks (Pharm. Ztg., xl., 231) that pills of copaiba made with yellow wax possess a great many drawbacks. They not only require a long time to prepare, and, on long standing, become brittle, but, on account of the non-digestibility of the wax, only a small quantity of the copaiba is assimilated, most of it passing through the body unchanged, and thereby liable to cause diarrhœa and gastric disturbances. The author recommends the use of calcined magnesia for forming the mass. He proceeds by first adding from one to three drops of water to each 1 Gm. (15½ grs.) of the balsam, and then adds enough calcined magnesia to form a pill mass, to which any other ingredient may be added before forming it into pills. Pills of balsam of Peru can be prepared in the same way.

Creosote Pills.—On the ground that albumen chemically fixes creosote, Schreiber has devised the following method for preparing pills of that substance, which it is claimed are accurate in dosage and keep well:

Creosote	6 Gm.
Egg albumen, dried	3 Gm.
Distilled water	10 drops.

Mix and add powdered liquorice root and extract of liquorice sufficient to mass. Divide into 60 pills. These pills are insoluble in water, but are dissolved in the process of digestion. Dust with powdered cinnamon.—Apoth. Zeit., 1895, 273.

Creosote Pills.—For making creosote pills Mr. Martindale recommends the following formula:

Beechwood creosote	2 fl. dr.
Powdered soap	120 grains.

Place the creosote in a one-ounce, wide-mouthed bottle, add the soap, and mix well. Then digest on a water-bath until the ingredients combine.

Each two grains of the mass will contain, practically, 1 minim of the creosote. This mass can be combined with other ingredients without decomposition. J. W. England has used the following formula:

Creosote	12 minims.
Powdered licorice root	18 grains.
Powdered soap	1 grain.
Powdered acacia	6 grains.

Triturate well the creosote with the liquorice root until the latter has absorbed the creosote, and then add the soap and acacia. Make into a mass with an excipient of glycerin and syrupy glucose (1 part by volume of the former to 4 parts by volume of the latter). Divide into 12 pills, and inclose in gelatin capsules. Encapsulating in gelatin is essential to mask the creosote odor. Where relatively large quantities of creosote are desired to be given, an excellent method is to admix the creosote with twice its volume of olive oil, and inclose in gelatin capsules.—Amer. Jour. Pharm., 1895, 331.

Reduced Iron in Pills.—W. F. Hary gives his experience with a number of pill masses containing reduced iron and extract of cascara. The pills have been silvered, and after a few hours began to swell and the silver coating cracked. The addition of glycerin to such masses markedly increased the tendency to crack. The same difficulty was met with in a pill mass containing extract of logwood and reduced iron, when a small quantity of glycerin was used to make a mass. Also in the case of pills containing arsenous acid and reduced iron massed with glycerin of tragacanth. He found that extract of gentian and reduced iron made a pill which kept well, and he suggested that this excipient should be used in all such cases. —Pharm. Jour. Trans., 1895, 1015.

Papain in Combination in Pill Form.—G. Rankin advocates the administration of papain in the pilular form combined with iron, and gives as a typical pill for treatment in atonic dyspepsia: Ferri sulph., papain Finkler, āā gr. ij.; ext. cannab., ext. nucis vom., āā gr. ¼; ext. rhei, gr. ½ ft. pil. Pharm. Jour. Trans., 1895, 1191.

Pill Coatings.—The relative merits of the coatings were considered by H. Dyson, Chem. and Drug., 1895, 210.

Sulphate of iron pills were taken, and the point of disintegration tested by ferricyanide of potassium present in the water. Those coated with silver gave ppt. in 22 minutes; with sandarach in about 25 minutes; with tolu about the same as last; with "pearl" coating in an hour and a half; with gelatine in one minute, 10 seconds. Gelatine was thus the best, and the author scouted the objection raised to it as a coating on the score of the heat used in making the coating. Pearl coating was bad, as the pills had to be made as hard as possible. He recommended a one in three solution of gelatine for the coating. Dyson's recommendation of gelatine-coated pills is not agreed with altogether. Cascara sagrada and aloes were mentioned as ingredients in a pill unsuited to gelatine coating, and his verdict on the effect of heat in making gelatine solution was challenged.

Salol as a Pill Coating.—Oeder has recently called attention to the fact that in using salol-coated pills, the physician may sometimes obtain the physiological action of salol itself where that is not desired. He therefore recommends (Berlin Klin. Woch., 1894, 364) that the pharmacist write on the label of salol-coated pills the amount of salol present as a guide to the physician. He also suggests that when administering such pills to febrile patients, the temperature of the stomach be lowered for two or three hours, either by swallowing pieces of ice or by drinking cold fluids so as to prevent the melting of the salol coating.

He further suggests the possibility of obtaining for use in such cases a salol of higher melting point than the commercial article generally used.—Chem. and Drug., 1894, 234.

Lanolin as a Pill-Excipient.—Lang ("Monatsh. f. Prakt. Derm.," 1894, 516) lauds lanolin as an excipient for pills to contain mercury, arsenic and similar irritant minerals. The following are some of his formulas:

1. Yellow mercurous iodide	5 Gm.
Extract opium	0.5 Gm.
Lanolin	1.5 Gm.
Milk sugar	4.5 Gm.

For 50 pills.

2. Calomel	2.5 Gm.
Extract opium	0.25 Gm.
Lanolin	1.5 Gm.
Milk sugar	3.75 Gm.

For 50 pills.

3. Arsenous acid	0.5 Gm.
Lanolin	3 Gm.
Milk sugar	6.5 Gm.

For 100 pills.

Arsenic Pill Mass.—Lang recommends the following formula:

Acid arsenous	1 part.
Milk sugar	13 parts.
Lanolin	6 parts.

—Monats. f. prakt. Dermat; Nat. Drug., 1895, 144.

Blaud's Pills.—J. Ince.—According to A. Blaud, nephew and successor of the inventor, the formula, which was not a secret remedy, was first given in 1831, and was inserted in the Nouveau Codex Francais, p. 555, formula 612, date1866, and has since that time up to the present been prepared in exact accordance with the directions which are here translated.

Blaud's Ferruginous Pills.

Sulphate of protoxide of iron, purified, dried and powdered, thirty grammes	30
Carbonate of potassium, pure, dried, thirty grammes	30
Gum arabic in powder, five grammes	5
Water, thirty grammes	30
Simple syrup, fifteen grammes	15

Dissolve the gum in a porcelain capsule, by the heat of a water-bath, in the quantity of water prescribed ; add the syrup and the sulphate of iron ; stir for some moments in order to render the mixture homogeneous ; add the carbonate of potassium previously powdered, constantly stirring wlth an iron spatula, and continue heating until the mass has acquired a pilular consistence, rather more hard than soft. Withdraw from the source of heat and divide the mass into 120 pills, which must be dried in the stove and silvered. Cork pills well in bottles ; each pill weighs about 40 Cgm. —Pharm. Jour. Trans., 1894, 131.

Creosote Pill-Mass.—Dissolve 2 parts of gelatin in 1 part of water and 8 parts of glycerin, by the aid of heat, and let it stay in the water-bath until all the water is driven off, which may be ascertained by weighing the capsule and its contents. To this massa gelatinosa add 30 parts of creosote, while the mass is still warm, and keep the mixture in a tightly closed vessel. When creosote pills are desired, they may be prepared from this mass, every four parts of which contain 3 parts of creosote, by adding any desired vegetable powder. The journal adds that the pills keep well, and that they may be coated by any of the ordinary processes. —Pharm. Zeit. f. Russ. ; Nat. Drug., 1895, 181.

Phosphorus in Pills.—R. H. Parker recommended the following method of preparing phosphorus pills : Dissolve sufficient phosphorus for 24 pills in 30 minims [2 C.c.] of carbon disulphide ; pour this solution upon 24 grains [1.6 Gm.] of powdered licorice in a pill-mortar, and stir uniformly within the smallest possible space, by means of a spatula, until the solvent is nearly evaporated. When the mixture is nearly solid, but still moist, add enough syrup, together with 4 minims [0.25 C.c.] of glycerin and 2 grains [13 Ctg.] of powdered tragacanth, and knead until a homogeneous pill-mass is formed. Then add any other ingredient desired, and divide the mass into 24 pills. Phosphorus pills prepared in this manner, it is stated, need not be coated, and keep without material loss or oxidation. For determining the amount of free phosphorus, the author's method is to extract with carbon disulphide, oxidize to phosphoric acid, and titrate with standardized uranium-acetate solution.—Pharm. Jour. Trans., 1894, 197.

Sandalwood Oil Pills.—Calmel (Apoth. Zeit., 1894) recommends : Melt 4 Gm. of rosin and add 5 Gm. of the oil previously ground with ½ Gm. magnesia. Mix well and when cold divide into pills.

Sodium Nitrite Decomposed in Pills.—Pills containing sodium nitrite and extract of gentian have been observed to swell up and evolve red fumes. Acidity of the extract has been suggested as possibly the cause of the decomposition.—Amer. Drug. and Pharm. Rec., 1894.

Solveol in Pills.—Hillebrecht makes pills, each containing 0.5 Gm. of solveol, by evaporating 60 Gm. of solveol down to 30, adding 2 Gm. of powdered acacia, massing with powdered liquorice (about 20 grs.) and sprinkling with powdered cinnamon.—Ibid., 1895, 338.

Thyroid Pills.—The following process is much recommended in France for the administration of thyroid in cases of myxœdema. The fresh glands, freed as far as possible from fat, are dried on plates at from 40° to 50° C. The powdered mass is exhausted with ether to remove the remainder of the fat, and the residue made into pills with the aid of simple syrup. A thin coating of cacao is recommended in order to mask the odor.—Brit. and Col. Drug., 1894, 211.

PULVERES.

Preservation of Powdered Ergot.—The second edition of the German Pharmacopœia recommended the extraction of the oil from ergot by ether as a means of preventing deterioration. The third edition, however, forbids this treatment, as the ether extracts some of the virtues of the ergot along with the objectionable oil. Bertini suggests the use of benzine for extracting the oil, stating that it has no solvent action on the therapeutic constituents of the drug.—Bollet. Chim. Farm.; Amer. Drug. and Pharm. Rec., 1894.

A Seidlitz Powder.—A. Gunn made an examination of some powders, and found the blue powder to consist of magnesium sulphate and sodium bicarbonate. The white powder consisted of tartaric acid. Evidently there had been a mistake, or else it was a bold attempt to cope with the cutting system and its cheap prices. One wonders that the makers should expect the unusual effect of trying to dissolve the contents of the blue paper to pass unnoticed.—Pharm. Jour. Trans., 1894, 534.

Allen's Powder Divider.—The machine consists (Amer. Drug. and Pharm. Rec., 1895, 205) of a V-shaped trough, graduated on one side from 1 to 25, and a row of 26 V-shaped knives which divide the trough into 25 equal compartments. The outer knives at each end serve as gates to close the ends of the trough, while the 24 intervening knives are so arranged as to swing back, leaving the trough ready for the powder.

A spacer, also V-shaped, slides along a rod to mark off the number of powders required, and, when ready, the knives, spacer and end-gates slide along a tramway, leaving the trough empty. A leveler accompanies the machine and is a necessary part of it.

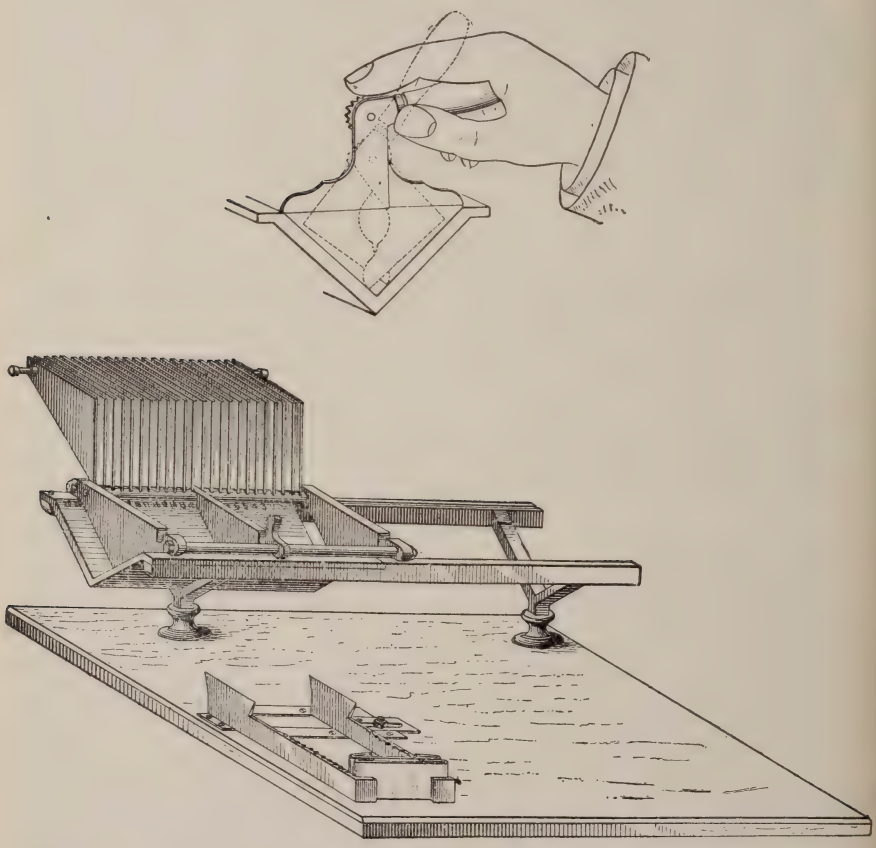
The leveler is held as in Fig. 69, and, with the index finger resting on

the notches, is adjusted to even off the powder at whatever depth it may lie in the trough, as shown in the illustration.

Since the trough and leveler both end in a point, there is no limit to the diminutiveness of the powder that can be divided.

To deliver the powders the knives are pushed along the trough by a gentle pressure with the forefinger of the left hand, allowing the powders to fall singly on the paper held under the right hand end of the trough. As

FIG. 69.



Allen's Powder Divider.

the powders are creased over the folder they are placed in the holder in the left-hand corner, where they are kept together in a position to be readily transferred to the box in which they are supplied to the customer. The dispensing of powders in this way requires only about a square foot of counter room, saves a third of the time, and furnishes any number of powders equally divided, whether they are small doses of morphine or large horse powders. The parts of the machine can be lifted out for wiping or

washing after using, and the knives can be slipped apart for occasional brightening up.

RESINA.

Natural Resins.—M. Bamberger.—The resin from Pinus laricio, which melts at about 100°, is resolved, on digestion with ether, into an α-modification (80 per cent.), which is soluble in ether., and a β-modification (20 per cent.), which is insoluble in ether. The α-resin is a reddish-white amorphous powder, which is soluble in dilute potash, benzene, and toluene, and dissolved in concentrated sulphuric acid forms a reddish solution; its methoxyl number is 33. The β-resin is a reddish-white powder, also soluble in dilute potash, but insoluble in benzene and toluene; it has a methoxyl number 62, and gives at first a green, and later a violet, coloration when hydrochloric acid is added to its alcoholic solution. When an excess of potash is added to an alcoholic solution of the α-resin, or of the crude resin, a colorless crystalline potassium compound is formed. A cold aqueous solution of the latter, when treated with hydrochloric acid, gives a powdery precipitate of pinoresinol, $C_{18}H_{18}O_6$, which gradually separates from its alcoholic solution in drusy masses, melts at 80–90°, contains two methoxyl groups, takes up two atoms of iodine, and furnishes the following derivatives: The potassium salt, $C_{18}H_{16}O_6K_2+4H_2O$ is very soluble in water and methylic alcohol, but is insoluble in ethylic alcohol; the calcium salt, $C_{18}H_{16}O_6Ca$, is a white insoluble precipitate; the diacetyl-derivative, $C_{18}H_{16}O_6Ac_2$, crystallizes in slender, white needles, and melts at 164°; the dibenzoyl-derivative, $C_{18}H_{16}O_6Bz_2$, crystallizes in short prisms, and melts at 160°. On treatment with methylic iodide, the potassium salt is converted into dimethyl pinoresinol, $C_{18}H_{16}O_6Me_2$, which crystallizes in scales and melts at 94°. The formula for pinoresinol must, therefore, be $C_{16}H_{10}O_2(OH)_2(OMe)_2$. The caffeic and ferulic acids found in an earlier investigation, are, in all probability, present in the resin in an uncombined state.—Monatsh f. Chem., 1894, 505.

Scammony Resin.—H. Spirgatis.—A reply to Poleck (Archiv der Pharm., 1894, 315), maintaining the correctness of his former work, and especially of the analyses and proposed formula of barium scammonate.—Arch. der Pharm., 1894, 482.

SOAPS.

Superfatted Soap.—C. D. Moffat considers that the calomel test (Proc. A. Ph. A., 1894) cannot be relied upon as a satisfactory means of ascertaining the neutrality of the soap. He suggests in preparing a superfatted soap to regulate the proportions of fat and KOH used according to the degree of superfatting desired in the soap. In the case of lard 19.6 may be taken as a sufficiently close approximation to the saturating power of 100 parts, and the quantity of KOH, of known strength, requisite for producing either a neutral soap or one containing any desired percentage of

fat in the unsaponified state, can be ascertained by a simple calculation.—Pharm. Jour. Trans., 1894, 41.

Extract of Soap.—A well-known brand of extract of soap has been analyzed in the laboratory of the Berlin Soap Boilers' Times, and found to have the following composition:

Water	27.55
Fatty acids	41.25
Combined alkali	7.80
Free alkaline carbonates	21.61
Sodium chloride	0.56
	98.87

—Brit. and Col. Drug., 1894, 561.

Sapo Animalis.—W. H. Martindale (Ibid., 575) obtained the following figures with the assistance of J. O. Braithwaite:

	Total Fatty Acids.	Total Alkali (Na_2O).	Total Alkali (K_2O).	Free Alkali (Na_2O).	Free Alkali (K_2O).	Free Fatty Acid.	Silica.	Ferric Oxide.	Water traces of Chlorides, Sulphates & Pigments.
Sapo animalis 1	65.01	8.65	.....	nil	.....	.1252	....	....	26.40
" " 2	66.17	9.81	.....	nil	.....	.1521	....	....	24.30
" " 3	64.99	8.15	.....	.20%	.....	.1818	....	....	26.19
" " 4	63.70	7.75	.....	.2811	.....	.2991	....	....	28.21
Sapo durus 1	66.68	7.236	.....	nil	.....	2.40	....	....	26.10
" " 2	63.90	7.57	.....	nil	.....	1.00	.13	....	30.13
" " 3	60.12	9.75	.....	nil	.....	.508	....	....	34.22
" " 4	66.32	10.30	.....	.0825	.....	2.351	....	....	23.397
Sapo durus (mottled) 1	65.37	8.03	.....	.010	.....	1.460	.262	.144	38.12
" " 2	69.59	8.24	.....	.038	.....	.390	.310	.261	21.401
" " 3	64.73	7.45	.....	.175	.....	.135	.146	.335	27.22
" " 4	75.2	7.56	.....	.1498	.....	.111	.755	.292	17.685
Sapo mollis 1	49.31	.....	11.13	.....	.012	.....	.315	....	38.781
" " 2	51.01	.....	11.506	.....	trace	.....	....	....	37.042
" " 3	44.178	.....	10.05	.....	.421	.321	....	....	46.01
" " 4	49.25	.....	10.87	.....	.197	.507	....	....	39.777
" " 5	32.71	.....	9.71	.....	trace	.553	....	....	58.083
" " 6	49.06	.....	7.01	.....	.310	.421	....	....	43.741
" " 7	57.425	.....	11.41	.....	.5361	.3301	.557	....	31.670
" " 8	46.99	.....	10.00	.....	.486	.322	....	....	42.701

Sapones medicinales pulvinares.—As a basis for *neutral soap* Eichoff gives a mixture of 75 parts of neutral stearine soap and 25 parts of medicinal soap. From this the other soaps should be prepared freshly as required. *Alkaline* soap powder consists of neutral soap, 95 parts; dehydrated sodium carbonate, 5 parts. Make into No. 30 powder. *Superfatted* soap powder consists of neutral soap powder, 95 parts; cacao butter

in powder, 5 parts. Formulæ for many medicated soap powders will be found in National Druggist, 1894, 244.

SPIRITUS.

The Keeping Qualities of Certain Samples of Spirit of Nitrous Ether.—H. W. Jones tests the keeping qualities under specially good conditions and finds the loss of ethyl nitrite considerably less than anticipated, as is shown in a tabular form. Column I gives the number of C.c. of nitric oxide yielded by 5 C.c. of the spirit when received, and Column II. the yield of gas after keeping for the time specified.

TABLE OF RESULTS.

	Sp. Gr.	I.	II.	Time of Keeping.	
1	.8400	41.0	39.5	15 months.	Solution of ethyl nitrite made from "B. P." quantities of materials.
2	.8398	41.0	34.0	15 "	
3	.8414	39.0	37.0	14 "	Trade sample.
4	.8392	39.0	33.5	14 "	" "
5	.8379	38.0	33.5	15 "	Made from purchased liquor, 1.7.
6	.8449	37.5	31.5	14 "	Trade sample.
7	.8430	37.0	31.5	14 "	" "
8	.8437	36.0	28.0	15 "	" "
9	.8477	36.0	14.5	15 "	" "
10	.8384	33.0	31.5	14 "	" "

—Pharm. Jour. Trans., 1894, 163.

Spiritus Ætheris Nitrosi.—W. Smith examined thirteen samples with the following results:

	Volumes NO yielded.	Remarks.
Sample 1	15.5	
" 2	13.5	
" 3	12.5	
" 4	23.0	Contained glycerin.
" 5	11.7	
" 6	12.3	
" 7	28.2	
" 8	35.0	Contained glycerin.
" 9	31.2	
" 10	30.0	
" 11	13.5	
" 12	32.0	
" 13	30.0	
" 14	0.0	
" 15	5.0	5 per cent. glycerin.
" 16	20.0	10 " " "

It therefore appeared that only six out of the thirteen samples were above the minimum official strength of twenty-five volumes; while one was

slightly under, and the remaining six far below it. Of the three obtained from, Mr. Hill No. 14 was made according to the official formula, and in 1892 yielded 37.3 volumes. No. 15 contained an addition of 5 per cent. of glycerin, and yielded 38.4 volumes; No. 16 contained 10 per cent. of glycerin, and in 1892 yielded 38.8 volumes. It thus appeared that with 5 per cent. of glycerin the spirit was much better preserved than with spirit alone, and that with 10 per cent. of glycerin the results were again much better than with five, but even the addition of glycerin did not appear an effectual preservative. These three samples had been kept stoppered and never opened since 1892. He examined the other samples for glycerin, and found it in two. One of these, No, 8, was full strength; the other, No. 4, was a little below the minimum. The foregoing results go far to strengthen the view that this preparation should be omitted from the Pharmacopœia, or that some better menstruum than rectified spirit should be used as a preservative.—Pharm. Jour. Trans., 1895, 809.

Lemon, Essence of.—There is considerable difference in opinion as to the best method of ascertaining the purity of this. Mr. Arthur Barrett said the polarimeter was utterly useless as a test, and, in fact, generally discredited all means hitherto discovered for testing the essence.—Chem. and Drug., 1894, 209.

Essence of Lemon Turning Red After Bottling.—Attention was recently called to a lot of essence of lemon, made by one of the large manufacturers, which, although nicely colored yellow with turmeric, quickly turned red when poured into the two-ounce panel bottles in which it was to be retailed. Upon investigation it was found that a few drops of distilled water introduced into one of the small panel bottles, and shaken, gave a slight alkaline reaction. The presence of the alkali was due to a sodium salt, either introduced in washing the bottles or originally present in the water used (it was not learned which was the case); this acting upon the yellow coloring matter of the turmeric changed it to a red color. Each one of the three following remedies was successful in meeting the difficulty: Thorough washing of the bottles with water free from alkali; washing the bottles with slightly acidulated water; or slightly acidulating the essence with citric acid before bottling. The reddened essence was readily restored to its proper yellow color by the addition of a small quatity of a solution of citric acid. It was found that only a very slight amount of alkali was required to turn the coloring matter of turmeric to a deep ruby-red color; dilute acids restored the yellow color; but in concentrated acids the yellow hue was turned to that of a reddish-brown.—Drug. Circ.; Brit. and Col. Drug., 1894, 266.

Estimation of Spirit of Nitroglycerin.—J. B. Nagelvoort gives the following method: Cool a proper quantity of a 10 per cent. alcoholic solution of nitro-glycerin to 15° C. Take 50 C.c. of it, pour this quantity into two litres of water, agitate the mixture and set it aside in a cool place over

night. (In cold weather take care that the water cannot freeze and break the bottle so as to endanger your life.) The next morning siphon off the water, only leaving enough in the bottle to transfer the nitroglycerin—which has separated and lies as a syrupy fluid on the bottom—into a 50 C.c. graduate which is graduated in 0.5 C.c. Use a funnel—this insures against loss; let the funnel drain. If the 10-per cent. alcoholic solution of nitroglycerin is of the required strength, there should be about 2.5 C.c. of nitroglycerin in the graduate. Since we measure, instead of weighing, our nitroglycerin, its volume has to be multiplied by its specific gravity, which is 1.600, in order to obtain its weight; $2.5 \times 1.6 = 4$. Applying a correction for the solubility of nitroglycerin in a large quantity of water (Allen says it is 1 Gm. in 800 C.c.), it is a simple calculation to verify the fluid under examination. Dilute, according to the figures found, to pharmacopœial strength.—Amer. Jour. Pharm., 1894, 527.

SUPPOSITORIA.

Suppositories Without Ice.—Every druggist has had more or less trouble in molding suppositories during warm weather, for which J. Hugh Elson (Meyer Bros. Drug., XVI, 37) submits the following remedy: Place the molds in sufficient water (enough to come within about one-eighth of an inch of top), and add about two ounces of ammonium nitrate to the water. This will produce a temperature of about 36 degrees F. (2.20 C.), if no more than fourteen ounces of water are used. By the time the suppositories are ready to pour into the molds the latter will be good and cold. After pouring in the suppositories add about two ounces more of ammonium nitrate to water, which will again lower the temperature to about 36 degrees F. Allow the suppositories to stand about twenty minutes, when there will be no trouble in removing them from the molds. By using more ammonium nitrate, the temperature may be lowered below the freezing-point of water. The ammonium nitrate may be recovered by evaporation, and the same lot used over and over again. It is recommended that the water used be saved until one-half or one gallon is obtained, and to evaporate this all at once. It has been found that the above solution, after standing for twenty-five minutes, is only 46 degrees F.; and the author has obtained suppositories quicker and better than when he used ice.

Agar-Agar in Glycerin Suppositories.—Lomuller uses agar-agar (Gilidium corneum) instead of gelatin to make glycerin suppositories. It produces a more transparent mass, which does not stick to the mould, does not clot, and gives a more elegant article when finished. The method employed is as follows: Take 10 parts of agar-agar in small pieces and 200 parts of water, heat until a soft paste is formed, then add with constant stirring 200 parts of glycerin.—L'Union Pharm., 1895, 197; Pharm. Jour. Trans., 1895, 1092.

Cocoanut Stearin in Suppositories.—C. J. S. Thompson reports (Chem. and Drug., 1894, 202) that the following formula gives more satisfactory results as a basis for suppositories than Brady's (Cocoanut Stearin, 9 oz.; Lard, 1 oz.; Oil Pimento, 20 min.) and others:

Cocoanut Stearin	6 parts.
White Wax	1 part.

Melt together with gentle heat over a water-bath. The melting-point of the product is said to be 98° F (36.6° C), and it solidifies again at 64° F (17.7° C). The mixture is considered an excellent suppository base for many combinations (such as belladonna, boric acid, etc.). If desired, the melting-point may be readily lowered by using less wax. It is reported that the base mixes well with vegetable extracts, and that such suppositories can with perfect safety be taken from the mold in about ten minutes.

Suppositories of Vegetable Extracts.—Harold Wyatt, Jr., recommends the following simple method (Pharm. Jour., liv., 790). Take a wide-mouthed bottle, and fit it with a good cork, or better, an india-rubber stopper. Put the cocoa butter into this bottle, warmed on a water-bath until liquefied, and then add the thinned extract or other medicament—the whole being shaken vigorously until ready to pour into the molds. It is stated that it is easy to get as much as 5 grains (30 Ctg.) of extract into a 15-grain (1 Gm.) suppository in this way, a thing rather hard to do by the usual method.

Capraol Substitute for Suppositories.—Pure palmitin for making suppositories may be obtained (Phar. Wochensch.) in this manner: Place fresh palm oil between layers of stout unstarched linen and press out at a temperature of about 10° C. Shake the press-cake with boiling alcohol for one hour, and after complete separation of the two layers harden the fat by cooling the vessel and remove the alcohol. Finally remove all traces of alcohol by warming the fat in a water-bath at not to exceed 50° C. The product constitutes pure palmitin. This, mixed with 5 per cent. of anhydrous lanolin, forms an excellent vehicle for suppositories, similar, it is claimed, to the capraol recently noticed.—West. Drug., 1895, 25.

Zinc-Alum Suppositories.—Heat 30 Gm. of powdered alum with 20 drops of water gently in a porcelain crucible, add an equal quantity of powdered sulphate of zinc, stir well, and pour the clear liquid formed into metal molds previously well oiled. Since they effloresce and break down on exposure to air, they are best dispensed each in a separate glass tube.—Amer. Drug. and Pharm. Rec., 1894.

SYRUPI.

Crystallization of Syrup.—Carles (Rép. de Pharm., 1894, 539), says that syrups will either keep intact, as is the case with syrups of chloral, cherry-

laurel, etc., or they will ferment as in the case of syrups of ipecac, opium, violets, fruit syrups, etc.; or they will crystallize, and then, as they have, so to speak, lost part of their augar, are considered easily liable to alteration. This idea is, however, found to be incorrect. Caries' experience is that syrup can easily be supersaturated with sugar, and when left at rest and in a cooler place than that in which they were prepared, they deposit the excess of sugar and return to their normal state and leave properly saturated syrup. In the author's experience this is the sole cause of the phenomenon of separation of the crystals in such cases.

He states that it is his habit, as soon as he notes a tendency of a syrup to crystallize, to put it on the water-bath and heat it. The separated sugar is at once taken up and remains in solution. Occasionally, he says, the crystallization will occur only on the bottom of the vessel, and is due to the fact that the latter is standing on some object colder than the surrounding atmosphere. This is especially the case in winter. All that is necessary in such cases is to reverse the jar or vessel, which, by equalizing the temperature, causes the crystals to be again taken up.

Rock Candy Syrup.—L. F. Kebler (Amer. Jour. Pharm., 1895, 143) gives the analyses of commercial samples as follows:

Serial Number.	Sp. Gr. at 15° C.	Reducing Sugar.	Reaction.	Inorganic Compounds.
1	1.324	Trace per cent.	Neutral.	None.
2	1.315	Trace per cent.	Slightly acid.	None.
3	1.346	57.50 per cent.	Acid.	Sulphates.
4	1.330	Trace.	Slightly acid.	None.
5	1.322	6.5 per cent.	Slightly acid.	None.
6	1.330	17.85 per cent.	Neutral.	Sulphates & Chlorides.
7	1.330	20.00.	Neutral.	Sulphates & Chlorides.
8	1.325	Trace.	Neutral.	None.
9	1.327	Trace.	Slightly acid.	None.
10*	1.571	36.13 per cent.	Slightly acid.	None.
11	1.322	5.00.	Slightly acid.	None.
12	1.340	7.00 per cent.	Slightly acid.	None.

His standard for "rock candy syrup" is, specific gravity about 1.320 at 15° C., from a trace of reducing sugar to two per cent., neutral or slightly acid in reaction.

It will be noticed that every sample contains some reducing sugar. Simple syrup on standing a short time is said to deteriorate, forming reducing sugar. Some say simple syrup on being boiled is slowly converted into reducing sugar, but the author's experiments do not support this latter assertion. A carefully prepared syrup, specific gravity 1.330, free from glucose, was boiled vigorously for 1½ hours, the evaporated water carefully replenished from time to time. A drop of the syrup was tested every

* Highly flavored with vanilla.

fifteen minutes for reducing sugar, but not a trace was detected in even the last test.

Permanent Syrup of Althæa.—M. L. Gesche (Jour. de Pharm., d'Anvers, Vol. li, p. 57) comments upon the difficulty with which the above preparation, as made according to the Belgian and other pharmacopoeias, can be made to keep; he then offers an improvement for its preparation, as follows: 20 parts of althæa root are macerated with 225 parts of cold distilled water, and the liquid strained and evaporated on a water-bath to 30 parts. By this means certain inert substances are separated. Thirty parts of 90 per cent. alcohol are now added to the evaporated liquid, which is then filtered and brought up to 229 parts with water. By now adding 409 parts of sugar and dissolving it by heat, a clear syrup is obtained which keeps well, it is maintained.—Pharm. Centralh., 1895, 145.

Syrup of Camphor, Compound.—The following is given as the formula of the British Royal Infirmary:

Camphor	2	drams.
Tincture of opium	10⅔	fl. ozs.
Tincture of squill	20	fl. ozs.
Oil of anise	2	drams.
Benzoic acid	3	"
Glacial acetic acid	6½	fl. ozs.
Ipecacuanha	1	oz.
Proof spirit	10	fl. ozs.
Loaf sugar	28	lbs.
Caramel		q. s.
Distilled water	12	qts.

Macerate the ipecac in the spirit for three days; strain, press and filter; dissolve the camphor, oil and benzoic acid in the acetic acid; then add the tinctures. Dissolve the sugar in the water with heat, and when cool add the other mixed ingredients and sufficient water to make the product measure 4 gallons. One fluid dram contains one minim of tincture of opium.—Pharm. Era, 1895, 11.

Creosote Syrup.—G. Vulpius (Suedd. Apoth. Ztg., 1895, No. 16) recommends the following procedure for making a syrup containing 10 per cent. of creosote: Triturate 10 parts of beech-wood creosote with 3½ parts of calcined magnesia; let it stand, well covered, for several days, mixing it every hour for a few minutes; then pour upon it gradually, with constant stirring, a mixture of 16½ parts of peppermint water and 70 parts of simple syrup. The odor and taste can be covered still more by the addition of 10 drops of spirit of peppermint. Another more convenient though not more expedient process, is this: The magnesia and creosote in the above proportions are put into a bottle and moistened with the peppermint water; then the simple syrup is added, and the whole is vigorously shaken. This is repeated at intervals of a few hours. At the end of

two days the mixture will become thick, so as to be unable to flow; but by vigorous shaking, or stirring with a glass rod, it can be rendered liquid again, after which it will not solidify again. On the contrary, the mixture becomes more limpid every day, but remains homogeneous, separating only after long standing, or not at all.

Syrup Hydriodic Acid.—F. G. Hills (Alumni Jour., 1895, 8), recommends a preparation containing 5 per cent. glycerin according to the following formula, proceeding the same as in the U. S. P. formula for the syrup:

Potassium iodide	gr. lxxvii.
Potassium hypophosphite	gr. ii.
Tartaric acid	gr. lxxvi.
Water	f. ℥iss.
Dilute alcohol	f. ℥ij.
Glycerin	q. s. ad. ℥ij.

This has been exposed to sunlight and air for about a month, but it is in perfect condition.

Syrup of Iron Chloride.—Frank Edel gives the following formula:

Solution of chloride of iron U. S. P.	160 mins.
Citrate of potassium	224 grains.
Citric acid	1 dram.
Water	8 ozs.
Glycerin	5 ozs.
Syrup	16 ozs.

Dissolve the citric acid and citrate of potassium in the water, add the solution of iron, and when reaction is complete, and the solution is clear, add the glycerin and the syrup.—Drug. Circ., 1894, 246.

Non-astringent Syrup of Ferric Chloride.—F. A. Sieker, in the Monatsblatt des New Yorker Deutschen Apotheker-Vereins (May, 1895?), writes concerning this copyrighted preparation as follows: According to the label of a manufacturer, "each fluidounce represents 40 drops of tincture of ferric chloride." The preparation examined was a transparent brown syrup, possessing a somewhat styptic taste and a distinctly acid reaction. The iron was not present in the form of the normal chloride, as was evident from its color, taste, and reaction toward litmus. The application of tests for citric acid and ammonia gave negative results. A similar preparation can be prepared by mixing 160 minims (10 C.c.) of solution of ferric chloride, U. S. P., with 12 fluidounces (360 C.c.) of syrup, and adding —in small portions at a time—enough solution of sodium hydroxide, U. S. P., to leave it faintly yet distinctly acid; to accomplish this about 2½ fluidounces (90 C.c.) of 5 per cent. solution is required. Lastly dilute with syrup to 16 fluidounces (360 C.c.) Mix well. The above quantity of syrup may be flavored with 30 minims of compound spirit of orange previously dissolved in a little alcohol. A syrup prepared by this method

contains ferric oxychloride and sodium chloride. An excess of sodium hydroxide must be avoided, as that would convert the iron into a saccharate. The finished syrup should possess a distinct acid reaction.—West. Drug., 1895, 238.

Syrup of Iodide of Iron of the Various Pharmacopœias.—Bourquelot gives the following summary of the contents of FeI_2 in 100 parts of the syrup of iodide of iron as demanded by the various pharmacopœias:

Greece	0.052
France	0.500
Belgium	0.520
Italy	0.610
Spain	0.670
Switzerland	1.000
Germany	5.000
Russia	5.000
Austria	5.082
England	5.700
Denmark	10.000
United States	10.000
Hungary	12.200
Holland	20.000

From this table it will be seen that the Dutch Pharmacopœia requires twice as much of the iron iodide as the American, and 400 times as much as the Greek. The table is a striking instance of the variation in national pharmacopœial requirements. A table of maximal doses of the various pharmacopœias in substances that do not vary would furnish an almost equally astonishing variation.—Jour. Pharm. Chim., 1895, 170.

Syrup of Iodide of Iron.—Ém. Bourquelot recommends a method of determining the amount of ferrous iodide in this preparation, which he describes as a modification of that contained in the U. S. Pharmacopœia. It consists in adding excess of silver nitrate to the diluted syrup, and then determining the amount of silver unprecipitated, by means of decinormal solution of ammonium sulpho-cyanate.—Ibid.

Extemporaneous Syrup of Ferrous Iodide.—Miss Austa Worthrop communicates the following process to the Pacific Drug Review for making syrup of ferrous iodide extemporaneously: Take of

Iodine	480	grains.
Water, distilled	2½	fl. oz.
Iron by hydrogen	150	grains.
Citric acid	10	grains.
Syrup, sufficient to make	10	fl. oz.

Place the iodine in a flask, add the distilled water, and reduced iron in small quantities by degrees. Care should be taken not to add too much iron at a time after the reaction has begun, which can be perceived by the

violet color of the liquid; also by the increase of temperature. The reaction is to be continued until the violet color has changed to green. A slight excess of iron may be added after the reaction has ceased, as it serves to prevent the oxidation during filtration. The syrup should be heated to near the boiling point and the solution of ferrous iodide filtered into the hot syrup. Then make a 50 per cent. solution of citric acid and add to the finished product. The citric acid tends to prevent the liberation of free iodine. The advantages of this formula are the rapidity in the preparation, which requires from fifteen to twenty minutes, the ease of manipulation, besides the additional advantage that it can be kept in pint or quart bottles from which a part can be dispensed without injury to the remainder of the preparation. Of course this method would cost a little more, but the additional cost is not great. The reduced iron is worth about 80 cents to $1.00 a pound, and it requires only about one ounce to make one quart of the syrup.—West. Drug., 1895, 238.

Syrup Iodide of Iron and Orange.—O. Girard suggests (Jour. Pharm. Chim., 1895, 102) the following:

Iodine, resublimed	4.10 Gm.
Iron filings	2.00 Gm.
Water	10.00 Gm.

This is made according to the French Codex, and to it is added a sufficient quantity of the following syrup to make 1 kgm.

Citric acid	5 Gm.
Distilled water	10 Gm.
Orange flavor (alcoholic solution)	10 Gm.
Simple syrup	q. s., ad 1 Kgm.

Syrup and Solutions of the Saccharated Oxides of Manganese and Iron.—F. Gerhard (Apoth. Ztg., 1894, 624) considers Dieterich's method of preparing these syrups as not quite satisfactory, and the finished products as objectionable owing to their disagreeable alkaline taste. He recommends the following formulas as yielding palatable and but slightly alkaline preparations.

1. *Syrup of Saccharated Oxide of Manganese*, containing 2 per cent. of manganese and 50 per cent. of sugar: Dissolve 10 parts of potassium permanganate in 500 parts of distilled water, and add, for solution, 60 parts of powdered sugar (or 100 of simple syrup). Set aside for several hours, until a brown gelatinous precipitate has formed; then heat the liquid several times to ebullition, and filter off the manganese hydroxide. Wash this by once pouring distilled water over it, and express the precipitate a little, until it weighs about 80 parts. Mix this with 87 parts of powdered sugar and 3 to 4 parts of soda solution (sp. gr. 1.160), and heat over an open fire or on the water-bath until a clear syrup is obtained, and then add distilled water until the whole amounts to 174 parts.

2. *Syrup of Saccharated Oxide of Iron* containing 2 per cent. of iron and 50 per cent. of sugar: Precipitate 30 parts of solution of ferric chloride (P. G.) with sodium carbonate (as in the preparation of saccharated oxide of iron of the P. G.); wash the precipitate, and triturate it with 75 parts of powdered sugar and 4 parts of soda solution (sp. gr. 1.160); heat the mixture over an open fire or on the water-bath until a clear solution results, which is either boiled down or mixed with distilled water—as the case may require—until it weighs 150 parts. Neither of these syrups should have more than a barely appreciable alkaline taste or reaction; and this will be the case, it is maintained, if not more than the above prescribed quantity of soda solution is used. Should it, however, be otherwise, owing to more soda solution having been used, the alkalinity should be overcome not by the addition of an acid, but with the aid of powdered potassium bitartrate, which is to be admixed with the syrup, and the mixture then set aside, under repeated stirring, until the alkaline taste has disappeared. The excess of cream of tartar is then allowed to settle, and the syrup is then carefully decanted. A palatable syrup may thus be obtained, it is stated.

3. *Solution of the Saccharated Oxides of Iron and Manganese*, containing 0.6 per cent. of iron and 0.1 per cent. of manganese: Take

	Parts.
Syr. sacch. oxide iron (as above)	300
Syr. sacch. oxide manganese (as above)	50
Distilled water	470
Cognac	100
Alcohol (90 per cent.)	75
Tincture of orange peel	3
Aromatic tincture Tincture of cinnamon Tincture of vanilla	1
Acetic ether	5 drops to each kilo (say quart).

This solution is said to be clear, of a beautiful brown color and a very agreeable taste, and quite stable.

Syrup of Calcium Lactophosphate.—E. Dieterich gives in his new Pharmaceutical Manual the following formula for this preparation:

Calcium carbonate	5 parts.
Lactic acid (Ph. G.)	12 parts.
Phosphoric acid (Ph. G.)	10 parts.
Distilled water	a sufficiency.
Syrup	400 parts.

Dissolve the chalk in the warm mixture of the lactic acid and 60 parts of distilled water, add the phosphoric acid, pass the whole through a filter 12–15 centimetres [5–6 inches] in diameter, wash with enough distilled

water to bring the filtrate up to the weight of 100 parts, and, finally, mix with the syrup.—Merck's Market Rep., 1894.

Syrup of Lime.—C. W. Patterson prepared seven samples of syrup of calcium for the purpose of determining the percentage of calcium oxide present and the specific gravity of the same. The lime used was taken from the interior of a large piece, tested and found free from calcium carbonate. Four were prepared by the U. S. P. formula and three with the modification that instead of evaporating 70 Gm. enough of the filtrate was evaporated to make it measure 100 C.c. This latter modification does not affect the specific gravity or the percentage of calcium oxide. In estimating the amount of calcium oxide, decinormal solution of oxalic acid and decinormal solution of hydrochloric acid were both used. Taking the average of the results obtained, the syrup of lime contains 2.69 per cent. of calcium oxide, and has a specific gravity of about 1.164. The samples prepared were colorless or but pale straw color. This gives a preparation averaging 1.14 per cent. more calcium oxide than the Liquor Calcis Saccharatus (B. P.). In the Nat. Disp. the formula there given is a compromise between the U. S. and British formula.

For the purpose of finding out whether heat is necessary in the U. S. P. formula, four samples, H, I, J and K, were prepared as follows:

The lime and sugar were triturated together and placed in a bottle containing 80 C.c. of water and shaken occasionally, H for 24, I for 48, J and K for 60 hours. Then the mixtures were filtered and water added to make the product measure 100 C.c. The results obtained show that as satisfactory a product can be obtained without heat as by the official formula, but the time necessary is much longer.

	Sp. G. at 15° C.	Percentage of Calcium Oxide.	
H	1.160	2.3800	Stood 24 hours.
I	1.172	2.6301	" 48 "
J	1.160	2.6530	" 60 "
K.....	1.164	2.7267	" 60 "
Average of I, J and K	1.165	2.6750	

A review of the companion to the latest edition of the British Pharmacopœia, published in the Pharmaceutical Journal and Transactions for June 16, 1894, states that in the preparation of the Liquor Calcis Saccharatus it is better to dissolve the sugar in the water before adding the lime. To test this with the United States preparation one sample was prepared by dissolving sugar in the water and adding the lime to the boiling solution. The boiling was continued for five minutes, the product strained, diluted, filtered and made up to 100 C.c. This sample gave 2.683 per cent. of calcium oxide.—Apothecary, Aug., 1894, 18.

Aromatic Syrup of Liquorice.—H. F. Hassebrock has communicated to

the Missouri Pharmaceutical Association the formula of a syrup he has prepared for disguising the bitter taste of quinine. His formula reads:

AROMATIC SYRUP OF LIQUORICE.

Cinnamon (Ceylon)	20.00
Ginger (Cochin)	12.00
Cloves	8.00
Nutmeg	3.00
Extract of liquorice, purified	50.00
Sugar	750.00

Alcohol and water, each a sufficient quantity.

Reduce the cinnamon, ginger, cloves and nutmeg to a No. 40 powder, moisten with 15 C.c. of alcohol, macerate for 24 hours in a covered vessel, then pack into a cylindrical percolator and gradually pour alcohol upon it until 100 C.c. of percolate is obtained; mix this with the sugar in a mortar, and set aside in a moderately warm place until the alcohol has evaporated.

Add water until 500 C.c. of percolate is obtained; dissolve the extract liquorice in the percolate with the aid of gentle heat, add the aromatized sugar, let the whole come to a boil, strain, and add enough water through strainer to make 1000 C.c.

Syrup of Hypophosphites, Compound.—L. L. Toland suggests the following for criticism:

Phosphoric acid (U. S. P.)	2 drams.
Calcium hypophosphite	256 grains.
Sodium hypophosphite	128 grains.
Potassium hypophosphite	128 grains.
Iron hypophosphite	16 grains.
Manganese hypophosphite	16 grains.
Citrate of potassium	40 grains.
Citric acid	15 grains.
Hydrochlorate of quinine	8 grains.
Tincture nux vomica	160 minims.
Sugar	12 ozs.
Water enough to make	16 ozs.

Make iron solution according to N. F. directions, then powder and dissolve remaining hypophosphites in 5 ozs. of water, and add iron solution to them. Then add tincture of nux vomica and mix; then add phosphoric acid and dissolve sugar by percolation with above solution, adding enough water to make one pint. Or instead of the above just add 2 drams of phosphoric acid to regular syrup of hypophosphites compound N. F., after it is made in the usual way, and it will keep any time required.—Pharm. Era, 1895, 461.

Non-precipitating Compound Syrup of Hypophosphites—A. F. M. (West. Drug., 1894, 362) proposes the following formula:

Calcium hypophosphite	256 Gm.
Sodium "	128 "
Potassium "	128 "
Manganese "	16 "
Tinc. citro-chloride of iron (N. F.)	1 oz.
Tinct. nux vomica	160 m.
Quinine hydrochlorate	8 Gm.
Sugar	12 ozs.
Water, enough to make	16 ozs.

The hypophosphites are dissolved in 6 oz. of water previously boiled, which is easily done by triturating the salts in successive portions of the water, the addition of an acid not being required. The quinine is dissolved in ½ oz. of warm water. These solutions are mixed and poured over the sugar. Shake well and add the tinctures of iron and nux vomica, then add enough water to make 16 fld. ozs. Shake until the sugar is dissolved; let stand for 24 hours, and filter.

Compound Syrup of the Phosphates.—Wm. Watson gives report of the analyses of four commercial samples of the syrup, which show the following results, the weights indicated being the contents of each fluid drachm:

	Sp. Gr.	Presence of HCl.	Quantity of $Fe_2P_2O_8$.	Quantity of $Ca_3P_2O_8$.
No. 1	1.295	Some.	.45 grs.	.84 grs.
No. 2	1.304	None.	.60 grs.	.87 grs.
No. 3	1.304	"	.52 grs.	.90 grs.
No. 4	1.322	"	.20 grs.	None.

Absence of an official standard for the syrup was mainly responsible for low quality.—Chem. Drug., 1894, 872.

Sulphuretted Hydrogen Evolved from Compound Syrup of the Hypophosphites.—It was suggested at a meeting of the Chemist's Assistants' Association, that the evolution of sulphuretted hydrogen noted in some specimens of this syrup was due to the presence of ultramarine in the sugar from which the syrup was made.—Amer. Drug. and Pharm. Rec., 1894.

Permanent Strawberry Syrup.—E. Dieterich republishes (Pharm. Ztg., 1894, 451) his recipe for preparing a permanent strawberry syrup, with the remark that the same has been extensively tried and found to be perfectly satisfactory. It is as follows: 500 parts of freshly crushed strawberries (the wild strawberries are the best) are allowed to ferment at ordinary temperature with 2 per cent. of sugar, then 50 parts of good white wine are added, the whole let stand for 24 hours, expressed, and clarified by filtration with the addition of 1 per cent. of its weight of finely powdered talcum. Then, in every 250 parts of the clarified fruit-juice are dissolved (cold or by heating up to 30° C. [86° F.]) 400 parts of granu-

lated sugar, and to every 500 parts of this syrup is added 1 part of citric acid; the whole is then filtered through flannel, and filled into bottles which are to be hermetically sealed. To render this syrup still more stable, the author recommends the addition of a small quantity of salicylic acid—say, $\frac{1}{10}$ per cent.

Essence of Tolu for Syrup.—According to the Brit. and Col. Drug., the following may be used:

Balsam of tolu	3 ounces.
Rectified spirit	6 ounces.
Glycerin	12 ounces.
Water, Rectified spirit	Sufficient to produce 2 pints.

Dissolve the tolu in the spirit and glycerin with heat; then add 12 ounces of water and let it cool. Pour off the milky liquid from resinous precipitate and rub it with a little powdered pumice stone and filter, washing filter with enough of a mixture of rectified spirit, one part, to water, two parts, to make final volume 2 pints. This makes an excellent syrup of tolu when mixed with simple syrup.—Amer. Drug. and Phar. Rec., 1894.

Preservation of Syrups.—A writer in the Boll. Chim. Farm. recommends benzoic acid as a preservative for syrups. It acts well as a preservative for syrups, he says, in the small proportion of 1 to 1000.—Ibid., 1895, 338.

Syrup of White Pine Compound.—Kennedy (West. Drug. 1895, 175), recommends the following:

Fluid extract white pine comp.	2½ fl. ozs.
Sugar	14 ounces avoirdupois.
Magnesium carbonate in fine powder	3 drams.
Chloroform	64 minims.
Morphine acetate	3 grains.
Acetic acid, enough.	
Water, enough to make 16 fl. ozs.	

Place the magnesia in the mortar, add the chloroform, and stir. Add 2½ ounces of sugar, mix, and then gradually add the fluid extract. Triturate to a smooth paste and gradually add 5 fluidounces of water, triturating thoroughly after each addition. Filter through a plain or good plaited filter. After the liquid has all passed, pour enough water on the magma to make the filtrate measure about 8 fluidounces. Thoroughly mix the water with magma, so as to get all the medicinal substance out of it; dissolve the morphine in 1 fluidram of water with the aid of a few drops of acetic acid, and add it to the filtrate, in which lastly dissolve the remainder of the sugar by agitation. It is best to put the filtrate in a

pint bottle and then add the sugar; when the latter is dissolved, add enough water to make 16 fluidounces of syrup. Each fluidounce of the finished preparation represents 30 grains each of white pine and wild cherry; 4 grains each of balm of Gilead buds, bloodroot and spikenard; 2 grains of sassafras: $\frac{3}{16}$ grain of morphine acetate; 4 minims of chloroform.

Syrup of Rhubarb.—J. Clover (Pharm. Jour. Trans., 1894) says that the present process for this syrup is wasteful. If the spirit is recovered by distillation, most of the aroma of the rhubarb and coriander passes over, and of course is absent from the syrup. He suggests the following formula:

Rhubarb root	8 oz.
Coriander fruit	8 oz.
Rectified spirit	5 oz.
Distilled water	q. s.
Refined sugar	6 lbs.

Powder the rhubarb and coriander, using No. 20 sieve. Place the portion which, after several times powdering, refuses to pass the sieve, at the bottom of the percolator, then add that which passes the sieve, using but little pressure. Mix the 5 ounces of spirit with 16 of distilled water, and pour on the powders. Macerate thus for twenty-four hours, then continue to add distilled water until 52 ounces have passed. In this dissolve the sugar with a gentle heat. Percolation may be continued until about 3 pints more have passed, this evaporated by water-bath to 4 ounces, and strained into a syrup.

Commenting on the above, the editor of the Journal says: "The aroma of the sample of syrup of rhubarb prepared by the suggested process is decidedly finer than that of the accompanying P. B. specimen. Besides being less clear, however, it also appears more liable to fermentation than the latter, the cork having been forcibly ejected from the bottle containing it, and the fermentative action continuing for some days, whereas in the P. B. syrup no such action was apparent under identical conditions.—Nat. Drug., 1894, 388.

Eclectic Syrups.—Frank Edel (Amer. Drug. and Pharm. Rec., 1895, 37) presents the formulas for the following syrups:

COMPOUND SYRUP OF ARALIA.

Spikenard root, Yellow dock, Guaiacum wood	āā 10 ounces.
Sassafras bark, Prickly ash bark, Elder flowers, Blue flag root	āā 8 ounces.

Grind the whole to a uniform coarse powder; moisten with alcohol diluted with one-third water, and allow to macerate for 48 hours; then percolate with the same menstrum to 10 pints. In this dissolve 12 pounds of sugar by cold percolation, and add glycerin, if necessary, to bring the bulk up to 2 gallons.

COMPOUND SYRUP OF CEANOTHUS.

Ceanothus herb	āā	4 ounces.
Lactuca elongata		
Cimicifuga		2 ounces.
Asclepias tuberosa	āā	1 ounce.
Asarum canadense		
Lobelia	āā	½ ounce.
Sanguinaria		

Proceed as before, reducing the drugs to a state of coarse powder and macerating with 33⅓ per cent. alcohol for 48 hours. Percolate to 5 pints and in this dissolve 6 pounds of sugar by cold percolation and add sufficient simple syrup to make the whole measure 1 gallon.

COMPOUND SYRUP OF STILLINGIA.

Stillingia	8 ounces.
Corydalis (root)	8 ounces.
Iris	4 ounces.
Sambucus	4 ounces.
Chimaphila	4 ounces.
Coriander	2 ounces.
Prickly ash berries	2 ounces.
Alcohol, 1 part	a sufficiency.
Water, 2 parts	

Reduce the drugs to a coarse powder, moisten with the menstruum and pack it in a percolator, and after 48 hours' maceration percolate to 5 pints. In this dissolve 6 pounds sugar by cold percolation and add glycerin to make 1 gallon.

COMPOUND SYRUP OF POKE ROOT.

Poke root	8 ounces.
American ivy bark	8 ounces.
Black cohosh	4 ounces.
Sheep laurel	4 ounces.
Oil of sassafras	15 drops.
Oil of wintergreen	15 drops.
Alcohol, 1 part	a sufficiency.
Water, 2 parts	

Mix the oils with the ground drugs; add sufficient menstruum to moisten, then pack the whole tightly in a cylindrical percolator and after 48 hours' maceration percolate to 60 ounces. In this dissolve 4½ pounds sugar by cold percolation and add simple syrup to make 6 pints.

COMPOUND SYRUP OF YELLOW DOCK.

Yellow dock	āā. 8 ounces.
False bittersweet	
American ivy bark	āā. 4 ounces.
Figwort	
Alcohol, 1 part	a sufficiency.
Water, 2 parts	

Proceed as before. Percolate to 5 pints and dissolve 6 pounds of sugar in the percolate by cold percolation. Make up to 1 gallon with simple syrup if necessary.

COMPOUND SYRUP OF HOREHOUND.

Red root	āā. 4 ounces.
Elecampane	
Comfrey	
Wild cherry bark	
Horehound	
Blood root	2 ounces.
Alcohol, 1 part	a sufficiency.
Water, 2 parts	

Percolate to 3¾ pints; add 4½ pounds of sugar to percolate and dissolve by agitation, making up the bulk to 6 pints by the addition of glycerin.

COMPOUND SYRUP OF CORYDALIS.

Corydalis tubers	10 ounces.
Twin leaf	5 ounces.
Blue flag	2½ ounces.
Sheep laurel leaves	2½ ounces.
Alcohol, 1 part	5 pints.
Water, 2 parts	
Sugar	6 pounds.

Percolate to 5 pints; add the sugar and sufficient simple syrup to make the bulk measure 1 gallon.

SYRUP OF RHUBARB AND POTASH.

Rhubarb	2 ounces.
Hydrastis	1 ounce.
Cinnamon	1 ounce.
Potassium carbonate	2 ounces.
Oil of peppermint	20 drops.
Sugar	4 pounds.
Alcohol	2 pints.
Water	4 pints.

Dissolve the potassium carbonate in a portion of the water and mix in a suitable-sized container with the rhubarb, hydrastis and cinnamon, the last three ingredients being in a state of fine powder. Now add the alcohol

and remainder of the water and allow to stand for 48 hours, agitating the whole briskly at frequent intervals. Decant the clear portion, and filter the remainder through absorbent cotton, adding sufficient water to make the whole measure six pints. In this dissolve the sugar by agitation, add the oil of peppermint and make up the bulk to 1 gallon with sugar.

COMPOUND SYRUP OF MITCHELLA.

Mitchella	1 pound.
Helonias root, Cramp bark, Blue cohosh	āā. 4 ounces.
Oil of sassafras	30 drops.

Incorporate the oil with the ground drugs; moisten with dilute alcohol, transfer to a cylindrical percolator and exhaust with a menstruum of 1 part alcohol and 2 parts water, continuing percolation until 6 pints are obtained. Dissolve the sugar in this by agitation in the cold.

It will be noted that an excess of sugar is ordered in several of these formulas. This is done, and cold percolation directed, because the small amount of sugar left undissolved in the percolator retains any dirt or foreign matter that might otherwise pass through and cloud the finished product.

The formulas given represent the syrups most commonly prescribed by eclectic physicians, and will yield satisfactory preparations, providing the directions are followed.

TABLETS AND TABLET TRITURATES.

Kola Tablets.—L. Bernegau (Apoth. Zeit., 1894, 704; Pharm. Centralh., 1894, 559) recommends the following:

Powdered kola	25.0
Cacao-mass	30.0
Powdered sugar	70.0
Aromatic mixture	1.0

The kola is roasted, whereby the bitterness is removed, and powdered. The constituents are melted carefully on a water-bath. The mass is cooled, then dried and powdered, and compressed in 2 Gm. tablets.

Tablet Triturates.—C. S. N. Hallberg (West. Drug., 1894, 446) in treating of the baneful influences of this class of preparations, says that medical men should begin to realize more generally these conclusions:

"1. That when full, prompt effects of any drug are desired it must be prescribed in the form of a *tincture* made from the crude drug of the best quality, and not from the fluid extract. 2. That alkaloids cannot replace their respective drugs any more than the *synthetic* products have displaced the alkaloids. 3. That by using tablet triturates they are simply popular-

izing the form of self-medication, the triturates now being put up and numbered according to the disorder for which they are recommended. 4. That old time patent medicines, herb women and Indian and Chinese traveling fakirs are preferred by many persons to modern physicians, because the former give them 'good old reliable medicines,' that 'work promptly and effectively,' instead of dimethylphenyl-isopyrazolon, acetphenetidin, and the hosts that have come and gone."

Tablet Triturates.—D. J. Thomas (Amer. Jour. Pharm., 1894, 329). Although triturate tablets possess, in many instances, an obvious superiority over pills, they are, however, objectionable in others. For example, in exhibiting the bitter substances, such as strychnine, quinine, aloes, etc., owing to the absence of a coating, it is quite impossible to swallow a tablet containing any of the bitter medicaments without leaving some indication of its bitterness upon the sense of taste. An occasional objection is found in some instances where the active constituent of the tablet is crystalline in character; owing to the recrystallization in the tablet, it becomes hard, and consequently rendering it difficult to reduce to a powder unless subjected to extraordinary pressure, thus destroying, to some extent, one of the advantages claimed for it. Again, if the quantity of adhesive matter introduced into the tablet for the purpose of maintaining its form and holding it together has been used in excess, its ready reduction to powder is impeded. Care, therefore, should be intelligently exercised in their preparation, or, again, their superiority over coated pills becomes weakened. From personal observation, it must be admitted that in proportion to the increased demand for triturate tablets there appears to be a decreased demand for pills, capsules, and powders. While there still remains an active demand for pills, powders are being rapidly supplanted by tablets. It is not claimed by the writer that this condition exists wherever tablets have been introduced. The reverse of this condition may exist in many sections.

It is a settled fact that triturate tablets have come to stay, at least until some better means has been discovered that will accomplish the same end. As there is no secrecy about the "modus operandi" for the manufacture of triturate tablets, they can be produced by the average pharmacist through the employment of ordinary skill and the utensils he now has at hand; *i. e.*, with mortar and pestle, glass or porcelain slab, spatula, and a few sets of hard rubber or metallic moulds, he finds himself equipped for the production, on a small scale, of any tablet that the large manufacturer is capable of making, with the exception, as in all other things, that they can be made on a larger scale at a greatly reduced cost. The possible danger of ultimate injury to the prescription business can only result where the pharmacist fails to recognize the preference the physician is disposed to show towards the triturate tablets, and refuses to supply them when prescribed.

TINCTURÆ.

Pharmacopœial Instructions for the Preparation of Tinctures.—R. H. Parker suggests that, in the next issue of the Brit. Pharm., all tinctures and similar preparations, of about 1 in 8 strength, be ordered to be prepared by maceration only, without final adjustment of quantity; those of 1 in 4, or greater strength, "to be prepared by percolation, so that N fluid parts of percolate represent the activity of one part of drug." The strength of the products would thus be clearly defined, and the pharmacist might be allowed to select his own method of recovering the residue, according to the quantity of material dealt with. The "making up" is already omitted from the directions for preparing tinctures of nux vomica and cannabis indica. The formulas for tinct. zingiberis and tinct. camph. co. might be simplified; the former to be prepared by diluting the stronger tincture, and in the latter replacing opium by an equivalent of its tincture. —Pharm. Jour. Trans., 1894, 155.

Alteration in Amount of Extractive in Tinctures.—J. Barclay examined fifteen of the most frequently-used tinctures after their having been kept for periods varying from 26 to 167 days. Seven were found to have lost extractive, viz., those of orange, calumba, cinchona (compound), foxglove, gentian (compound), henbane and ginger (strong). Of these, strong tincture of ginger had lost .26 per cent. by volume of extractive in 167 days; tincture of henbane had lost .14 per cent. in 78 days. The remaining eight tinctures had gained extractive, viz., those of arnica, cardamom (compound), catechu, gelsemium, myrrh, opium, rhubarb and valerian. Of these, tincture of myrrh had in 106 days gained .34 per cent., and tincture of rhubarb .27 per cent. in 64 days. All the tinctures experimented upon, with the exception of those of arnica and valerian, were stored in casks. Where through the presence of a vent-hole there would be some slight evaporation continually taking place, and while in the case of the seven first-named tinctures this evaporation was not sufficient to counterbalance the deposition of extractive, in that of the latter eight tinctures it was more than sufficient. The experiments point to the conclusion that there is no serious loss of extractive in a tincture stored under ordinary conditions during a reasonable period of time.—Pharm. Jour. Trans., 1895, 722.

Recovery of Residual Tincture from Marcs.—R. H. Parker (Pharm. Jour. Trans., 1894, 141) reports very favorably on displacement by water, as a means of recovering, the residual tinctures in marcs. By experimenting with strong tincture of ginger, tinctures of cinchona, rhubarb, opium, etc., he obtained results which led him to say that the preparation of tinctures, liniments, etc., by percolation and displacement by water is much more economical than by pressure of the marc. The results are better where there is less affinity between and miscibility of the displaced

fluid and the water, the point of distinction between the tincture and the water or watery extract dropping being more clearly marked then. The objections taken to his conclusions in the discussion on his paper were based more on the necessities of practical convenience than on any real contest of the accuracy of the results obtained. Bearing on this subject, the same author found fault with the B. P. directions for making tinctures, the "making up" being the thing complained of. He recommends that one in eight tinctures be made by maceration only, one in four by percolation, so as to make N fl. oz. = 1 oz. of drug.

Tinctures and Tincture-Making.—H. W. Jones.—The Pharmacopœial (B. P.) tinctures are made by several methods, the bulk being produced by a combination of maceration, percolation and pressure. By those means it was intended to fully exhaust the drugs, and present the soluble constituents in a definite volume of liquid. The purpose was answered, but with more complex working than necessary. In the original edition of the 1885 Pharm., Tinct. Zingib. fort. was directed to be prepared by percolation, but in the "Additions," subsequently published, three others were ordered to be so made. The general instructions for tinct. hamamelidis and tinct. hydrastis were perfect, and it was to be taken as a sign of the times that the more modern method was recognized. That the bulk of the tinctures of the Pharmacopœia could be so prepared would not be controverted. The three essential points to be attended to were: (1) To damp as quickly as possible to avoid loss, and to store in a closed vessel during maceration; (2) To properly pack the moistened ingredients so as to avoid air spaces; and (3) To keep the surface just covered with the menstruum during the entire process. Some operators packed straightway into the percolator after damping, but in most cases, at least, the author found it advisable to store for 24 hours in a separate closed vessel, and to finally mix well together, adding a little more menstruum if really necessary before the final packing. The percolator was generally advised to be of a conical shape; but operating on a large scale, with a considerable amount of material, a vessel of that form had the disadvantage of giving a large surface to the upper layer of spirit, and consequent liability to loss from evaporation. Whatever form of percolator was adopted, it was a distinct advantage to have the bottom part of it tapering. For the author's own part he preferred a tap which could be closed or opened to a simple tube; and showed a model of a percolator which he had devised. This consisted of an upright, somewhat narrow, metallic vessel, with a funnel-shaped bottom part provided with a tap having a thread-screw on the outer part, so that tubes of various lengths could be screwed on or off. The special feature of the percolator being a band of metal around the bottom part deep enough to enclose the tap when the tubes were removed. By means of the band the apparatus would stand erect on any plane surface. In use the percolators were arranged on a stout bench with diamond-

shaped holes, through which the hand could be passed to turn on or off the taps or fix the tubes.

In commenting on various tinctures, it was considered that with tinct. camph. co., the opium could advantageously be replaced by a corresponding amount of tinct. opii. as advocated by Squire. In the case of tinct. cardam. co., the author said he would venture to suggest that the variety of raisins known as "sultanas" might be used, as they contained no stones. As was well-known, the B. P. instructions gave a product of more than 80 ozs. without making up. It was a tincture which could be prepared by percolation if the various ingredients were well mixed together. It had been suggested to prepare tinct. cascarillæ by means of a weaker spirit, but Groves found that even with proof spirit it was nothing like so good as when the spirit was slightly stronger. Tinct. guaiaci ammon. would be better prepared with a stronger menstruum. Wright's proportions of 18 ozs. S. V. R. and 2 ozs. liq. ammon. fort. giving 82 grs. per oz. of solids as against 62 grains for the present spirit of ammonia. Tinct. myrrhæ was an example of a tincture which could not be prepared by percolation without previous maceration. Tinct. podophylli should not be fluorescent. The author had recently seen a tincture that was strongly so; and he had pointed out some years ago that that result was due to the employment of resin precipitated in alum water instead of by the B. P. method. Heat was necessary in making tinct. quininæ, and the suggestion of Lunan as to the substitution of carbonate of ammonia for the hydrate was worthy of the attention of the pharmaceutical authorities, since the product formed a clear solution with 13 parts of distilled water, whereas the present tincture required 26 parts.

However made, tincture marcs retained a decided amount of spirit. By pressure, a certain proportion could be obtained; but a relatively large quantity was left behind. He had found, for example, that a batch of 60 gals. of tinct. opii. would leave something like 2 gals. in the marc; and a similar amount of spirit would be retained by marcs resulting from 16 gals. of tinct. cinchon. co., tinct. hyoscyami and tinct. sennæ. In no case was it desirable to wash out that spirit with water if it were intended to form a part of the finished product. On the whole, he preferred to percolate right through with the proper menstruum till the full bulk was obtained, and to recover the spirit from the marc by distillation in a large still, with sufficient water to prevent the formation of clots of material. To wash certain marcs with water took considerable time, during which the mass was apt to become mouldy or decompose.

In reference to standardized tinctures, there was a definite statement as to the alkaloidal strength of both tinct. opii. and tinct. nux vomicæ in the Pharmacopœia. Experience had shown that the menstruum did not exhaust the opium, but by taking a tincture made with a strong opium and one made with a B. P. drug, the percentage required could be obtained by

mixing the two in the proportions indicated by an assay. As to the method of assaying tinct. opii, he would prefer to follow the B. P. method as closely as possible, rather than attempt washing out with acetic ether and chloroform. Familiarity with tinct. nux vomicæ had not strengthened the view that the use of extract was the best method of preparing it. Similarly the employment of extracts of other drugs was not to be advocated. The subject had received particular attention at the 1893 meeting of the British Pharmaceutical Conference, and had been condemned. A tincture was supposed to contain the constituents of the drugs, as they existed in the drugs themselves, unaltered by heat. Gerrard's statement had not been controverted, that with atropine, a solution boiled with alcohol even for ten minutes lost 50 per cent. of its alkaloidal power. At present there was no direct authority for standardizing generally, but there was such a demand for standardized preparations, and the result was that, in the absence of official methods, each wholesale house or each pharmacist was left to fix the standards, so that uniformity was not likely to exist. Something was wanted more than mere statements of percentages: the methods of analysis should be well defined. Mayer's solution was out of date, and it was hardly settled whether volumetric methods or gravimetric processes should be followed; or even in some cases, as that of aconite, if the test should not be physiological. Messrs. Wright and Farr stood pre-eminent amongst British workers, and had for several years been publishing the most important results, and he thought their methods of assay might well be adopted. Various standards had been suggested, but in most cases of average good drugs, the author of the paper had met with a practical difficulty which required some consideration. It was, that it was not difficult to obtain drugs frequently above any average that might be fixed, and the question arose, "Should we use less to produce a preparation of 'average' strength?" He thought not, as the Pharmacopœia distinctly ordered a definite weight to be taken, so that, for the present at least, he ventured to suggest that the standard adopted should be that approximating to the highest percentage. Concentrated tinctures might receive some attention at their hands. They were more properly described as fluid extracts, and experience had shown that fluid extracts prepared with proof spirit, at least, were somewhat unstable. So that it might be asked what strength of spirit should be used for exhaustion? As an example, they had tinct. catechu, and to produce a concentrated tincture four times the ordinary strength, it was required to dissolve or exhaust 10 ounces of catechu, with sufficient proof spirit to produce one pint of finished liquid. Could a permanent and satisfactory preparation be so made? Again, capsicum formed a tincture in which an excess of spirit might appear to be used for exhaustion, but the dose being small, it was probably better for dispensing purposes than a stronger tincture given in smaller amounts. If concentrated tinctures were used, let them be employed for special purposes

rather than for the preparation of the official tinctures.—Brit. and Col. Drug., 1894, 489.

Detection of Methylated Spirit in Tinctures, &c.—A. Ashby has satisfied himself that, of the numerous methods proposed, the test with sodium nitro-prusside in the presence of ammonia is the best. The red color will appear within ten or fifteen minutes. The constituent to which the reaction is chiefly due has yet to be ascertained. When examining alcoholic liquids free from solid matter, the test may be applied directly by mixing the sample with an equal bulk of a 1 per cent. solution of sodium nitro-prusside and adding a few drops of ammonia; but in the case of official tinctures, 23 C.c. of the sample is distilled and the first 5 C.c. which pass over tested. Ethereal solutions are distilled to dryness, and successive portions of the distillate are tested; if, however, the sample is very weak in spirit, it is best to add 2 or 3 C.c. of strong, pure alcohol to the distillate before applying the test. If the not very probable presence of a sulphide be suspected, it is best to add some fixed alkali before distilling.—Analyst, 1894, 261.

Stability of Alkaloidal Tinctures.—Farr and Wright affirm that standardized alkaloidal tinctures are stable, and the only instances in which any notable loss of alkaloid is apparent are in the case of the tinctures of cinchona and green hellebore, and it is doubtless due to the mechanical carrying in solution of traces of alkaloid by deposited resinous and extractive matter. The average loss in the most extreme case, that of the tincture of green hellebore, does not amount to 5 per cent.—Pharm. Jour. Trans., 1894, 123.

Determination of Alkaloids in Tinctures.—Farr and Wright (Ibid., 124) have experimented with the view of testing the relative merits of gravimetric and volumetric methods for the determination of the alkaloidal strength of tinctures. They come to the conclusion that, on the whole, the former are the more reliable of the two, and more suitable for the use of the average retail pharmacist.

TABLE SHOWING COMPARATIVE RESULTS OBTAINED IN ESTIMATING TINCTURES — (A) GRAVIMETRICALLY, (B) VOLUMETRICALLY.

Tincture.		Alkaloid by Weight. Mean of Two Estimations.	Alkaloid Indicated by Direct Titration of Chloroformic Solution with $\frac{HCl}{20}$			Alkaloid Indicated by Dissolving Crude Alkaloid in excess $\frac{HCl}{20}$ and titrating back with $\frac{Ba_2HO}{100}$			
			Methyl-orange.	Iodeosin.	Phloxin.	Methyl-orange.	Brazil Wood.	Iodeosin.	Phloxin.
Aconite	1	.013	....	.018	.019	.020	....	.018	.018
	2	.014	.019	.019	.022	.022	.022	.022	.025
Belladonna	1	.022	....	.022	.022	.022	.021	.020	.020
	2	.031	.033	.032	.034	.031	.032	.032	.030
Cinchona	1	.074	....	.144	.145	.078	....	.072	.071
	2	.087	.093	.087	.086	....	.052	....	....
Conium	1	.047	....	.042	.042	.042	.042	.042	.042
	2	.019 (Hydrochlorate)	.017	....	....	....	....	.016	.015
Colchicum	1	.024	....	....	....	.005	....	....	.005
	2	.028	....	....	....	.006	....	.005	....
Gelsemium	1	.019	....	.018	.019	.019	.017	.018	.018
	2	.024	.024	.020	.024	.027	.024	.024	.024
Hyoscyamus	1	.005	....	.005	.005	.005	.005	.005	.005
	2	.009	.010	....	....	.0085	.008	.008	.0086
Jaborandi	1	.020	....	.018	.018	.017	.017	.017	.017
	2	.018	.018	.017	.017	.018	.018	.017	.018
Lobelia	1	.009	....	.009	.008	.008	.008	.008	.008
	2	.009	.008	.009	.009	.007	.008	....	....
Nux vomica	1	.043	....	.044	.043	.043	.042	.041	....
	2	.066	.066	....	....	....	.066	.066	.065
Opium *	1	.100	....	....	....	.095	.094	.095	.094
	2	.100	....	....	....	.099	.099	.097	.099
Stramonium	1	.011	....	.011	.011	.011	.011	.010	.010
	2	.017	.017	....	....	.017	.017	.016	....
Veratrum viride	1	.023	....	.023	.022	.019	.017	.019	....
	2	.027	.027	.020	.023	.023	.021	.024	.019

* For the opium estimations, a solution of anhydrous morphine obtained in estimating the tincture by the B. P. process was employed. This was dissolved in excess of $\frac{N}{20}$HCl.

Tinctura Annatto.—100 parts of annatto are extracted with 100 parts of water, containing 1.5 parts of K_2CO_3. It is then extracted twice with 100 parts of water containing 0.6 parts of K_2CO_3. This is then evaporated down to 60 parts and mixed with 12 parts of alcohol, allowed to stand for some hours, and then filtered.—Pharm. Centralh., 1894, 496.

Compound Tincture of Coal Tar.—Duhring (Am. Jour. of the Med. Sciences), from a trial of many formulas, concludes that the best tincture of coal tar is made with the aid of tincture of quillaja. That the strength of the tincture of quillaja should be 1 to 4, with 95 per cent. alcohol. That the coal tar (1 part) should be digested with the tinct. of quillaja (6 parts), with frequent agitation, for not less than eight days, and preferably

for a longer period, and finally filtered. The resultant product is a brown-black, clear tincture, which, upon the addition of water, forms a cleanly yellowish emulsion, the color and certain other characters varying with the kind of coal tar employed. The tincture is stimulating, and is prescribed usually largely diluted, with from 10 to 60 parts of water as a wash; and is useful where tar is indicated, as in certain forms of eczema, psoriasis, pruritus, and in other inflammatory diseases of the skin. It is often more useful when employed weak than strong. This preparation, which may be designated as "compound tincture of coal tar," takes the place of several similarly composed proprietary preparations as "liquor carbonis detergens" and "coal tar saponine."—Phila. Polyclinic; Amer. Drug. and Pharm. Rec., 1894.

Tinctura Ergotæ Ammoniata.—J. T. Hornblower thinks that this preparation remains clear on adding water to it because the oil (fixed) of the ergot and the soap formed from it by the ammonia, respectively remove part and prevent the remainder of the essential oils from being thrown down from solution; this, however, can only apply when the whole of the tincture has been in contact with the ergot as in percolation; for if made by maceration, and any deficiency in quantity of finished tincture made up by adding Spirits Ammon. Arom., a cloudiness would be produced, dependent on the amount added.—Pharm. Jour. Trans., 1894, 242.

Tincture of Ferric Chloride.—H. G. Beck examined 12 samples with the following results:

Sample No.	Specific Gravity.	Fe_2Cl_6 Per Cent.	Parts by Weight of the Solution used in making the Tincture.	Made from Solution Number.	HNO_3	Ferrous Salt.
1	.980	13.15	35	1	o	slight
2	.987	10.00	26.6	2	o	slight
3	.972	11.52	.....	.....	o	o
4	.980	13.80	.....	.....	o	trace
5	.980	13.33	.....	.....	trace	o
6	1.028	17.09	45	4	slight	o
7	.927	10.25	28.6	7	o	decided
8	.948	11.50	.....	.....	slight	o
9	1.032	11.31	.....	.....	o	much
10	1.031	12.68	33.6	6	o	much
11	1.030	10.71	29	3	trace	o
12	.972	13.03	.....	.....	much	o
Average	.989	12.36				

—Amer. Jour. Pharm., 1894, 327.

Tincture of Iodine.—B. Popel has made experiments tending to show the effects of impurities and of light on tinct. iodi. He made a tincture of iodine from pure alcohol, and one from alcohol containing 2 per cent. amyl alcohol. The preparation, exposed to dispersed daylight, that containing amyl alcohol showed decomposition sooner than that prepared from pure alcohol. When the experiments were carried on in the dark the loss of free iodine was even greater.—Chem. Zeit. (Rep.), 1895, 85; from Farmazept, 1895, 127.

Tincture of Iodine and its Analysis.—J. F. Liverseege says the theoretical composition of tincture of iodine is: Iodine, 2.47 Gm.; potassium iodide, 2.47 Gm.; absolute alcohol, 69.56 Gm.; and water, 13.25 Gm.—or, in all, 87.75 Gm.; in each, 100 C.c.; and its specific gravity should, therefore, be 0.8775. Details are also given regarding both the direct and indirect determination of the specific gravity, and determining the amount of iodine present and other ingredients of the tincture. A tabular statement, showing the results of analyses, is given.—Pharm. Jour. Trans., 1894, 243.

Tincture of Iodine.—A. Sapin recommends this preparation to be kept exposed freely to light rather than in the dark, and the stock renewed every month, only a small quantity being made at one time. Prepared according to the Belgian Pharmacopœia, the tincture contains 7.649 per cent. of pure iodine; and of two specimens prepared at the same time, the one exposed to light contained 6.591 per cent. at the end of a year, while that kept in the dark contained 6.348 per cent. only. The explanation of these facts would seem to be that the hydriodic acid and ethyl iodide, formed by the action of the iodine upon alcohol, are readily decomposed by light, and the iodine is thus liberated again. The influence of temperature in diminishing the proportions of free iodine seems to be less than would naturally be imagined. Impure or redistilled alcohol that has been already used for some preparation causes the free iodine to disappear more rapidly, by reason of organic matters present which rapidly combine with it. Freshly prepared tincture of iodine, it is stated, will not froth appreciably when agitated, but in proportion to the age of the preparation and the alteration that has taken place, the froth formed is abundant.—Rev. pharm. des Flandres; Rép. de Pharm., 1895, 197.

Litmus Tincture, as is known, entails some difficulty in its preparation as an indicator, because there exists in litmus, besides the blue pigment (the so-called azolitmin), a turbid-violet one, which materially influences the sensitiveness of the reaction, for the reason that, whilst being reddened by acids, it is not changed to a blue by alkalies, but to a violet color. It is therefore desirable, in order to prepare a good and delicate litmus tincture, to first remove this objectionable violet pigment. M. Kretschmar has proposed a very serviceable method (Chem. Ztg., 1894, 682), but open

to the objection of being too complicated. Now W. Schaefer (Apoth. Ztg., 1894, 839) recommends the following procedure as more expeditious: Litmus, in cubes, is introduced into a percolator and completely exhausted with distilled water, and the extract is evaporated down to the weight of the litmus employed. To the residue three times its weight of 90 per cent. alcohol is added, and the liquid strongly acidulated with hydrochloric acid, and allowed to stand for two days. The azolitmin precipitates in brown flakes, whilst the violet coloring matter remains dissolved in the alcoholic fluid. The precipitate is collected upon a smooth filter, washed two or three times with acidulated hot water, until the very faintly reddish fluid is colored a pure blue by ammonia without any tinge of violet. The azolitmin is dissolved on the filter by distilled water, to which a few drops of ammonia are added, and the solution is diluted with distilled water to $3\frac{1}{2}$ times the weight of the litmus used, properly neutralized, and admixed with about 10 per cent. of alcohol (to render it more stable.) According to Schaefer, litmus tincture thus prepared leaves nothing to be desired.

Tincture of Strophanthus.—In an article by J. W. Englard (Amer. Jour. Pharm., 1894, 328) on a "Review of Martindale's Extra Pharmacopœia," gives the following: An improved process for making tincture of strophanthus consists of exhausting the ground and dried seeds with ether and drying, prior to exhausting with alcohol to form the tincture. The final product, it is claimed, is sure of representing all the therapeutically active principles of the drug.

TROCHES.

Troches of Phosphorated Chocolate.—A weighed quantity of phosphorus is dissolved in an equal quantity of melted cacao butter, and the solution filtered to get rid of any possible particle of so highly poisonous a substance. To this mass add sugar and cacao in powder, previously defatted, and spices to suit the taste; or, if desired, a sufficient quantity of prepared chocolate, freed of fat, may be used instead. The mass is worked up in a mortar, until a homogeneous mixture insuring perfect subdivision of the phosphorus is obtained. It is then divided into troches holding the desired quantity of phosphorus, in the usual manner. A convenient amount for each troche, as suggested by Gärtner, is a quarter of a Mgm., or about $\frac{1}{250}$ of a grain, which is the ordinary dose for a child. The pastilles are then coated, first with gelatin or other coating, and finally with pure chocolate.—Zeitschr. Oest. Apoth. Ver., 1895, 285.

UNGUENTA.

Casein in Ointments.—Casein is employed as an ointment basis by Unna. It is freed from fat by washing with alcohol and ether, then emulsified by the addition of potash or soda (3 parts to 97 of casein), so as to obtain a neutral product. A preparation consisting of casein, 2 parts, and glycerin, 1 part, mixes readily with soft paraffin, 3 parts, the product

resembling thick condensed milk. Acids, calcium salts and other substances which precipitate casein are, of course, incompatible with it. Tar and balsams should be mixed with one-fourth their weight of green soft soap before incorporating with the casein and other substances previously brought into a semi-fluid condition by the addition of soft paraffin and water. Such ointments are said to come more intimately in contact with the skin.—Scalpel and Journ. de Pharm. d' Anvers., li., 134.

Myronin is an ointment base, introduced by R. Eggert (Pharm. Centralh., xvi. 63), the constituents of which are soap, carnauba wax and chenoceti oil, the last-mentioned of which is credited with the properties of readily penetrating the skin, and of not becoming rancid easily. Myronin ordinarily contains 12½ per cent. of water.

An Improved Ointment Jar has been placed on the market which seems to possess distinct advantages. A circular plate, which fits snugly into the cylindrical jar, is provided with a perpendicular rod with a screw thread cut in its entire length. After setting this in the jar the latter is filled with the ointment and the peculiarly constructed lid adjusted, and then a thumb-screw is applied to the protruding rod. Near its periphery the lid is provided with an opening closed with a screw-cap. The jar being completely filled its contents cannot be influenced by the air, and this condition is preserved to the last, inasmuch as it is never opened for removing a portion of the ointment, this operation being effected by turning the thumb-screw, when the contents will be forced out of the small opening.—West. Drug., 1895, 190.

Substitute for Chrysarobin Ointment.—In applying chrysarobin ointments, the clothing is apt to be touched by them, which may give rise to inflammation. D. James (Pharm. Centralh., 1894, 627 recommends the following preparation of chrysarobin as an admirable substitute for the ointment form: Dissolve 1 part of chrysarobin in 7 parts of chloroform, and add 7 parts of linseed oil. Apply by means of a brush.

Chloroform Ointment is prepared, according to Codex, with lard and white wax. Crouzel (Rép. de Pharm., vii., 153), proposes to replace the lard by an equal weight of vaselin and the white wax by an equal quantity of paraffin, vaselin and paraffin having the advantage of being unalterable substances. There is no proof that the presence of chloroform keeps the lard and white wax from becoming rancid; while it is probable that the products of rancidity react upon the chloroform, thereby changing, or at least diminishing, its anæsthetic properties.

Cocaine and Its Salts in Ointments—In answer to the query as to whether they should be dissolved or not, Morley suggests that either the alkaloid or the salt should be dispensed by rubbing as finely as possible and mixing with the basis. He thinks the use of heat to dissolve the alkaloid undesirable and, perhaps, prejudicial to the efficacy of

the ointment.—Several persons agree with Morley, but the more general opinion is that solution of the alkaloid is desirable, and that this can be obtained at a perfectly safe temperature, and there can be no fear of the decomposition of the alkaloid. Opinions are divided as to whether the alkaloid should be substituted for the salt when the latter is ordered, or whether the salt should be dissolved in a minimum of water and then incorporated with the basis. It is suggested that if the latter course be adopted the salt would crystallize out again and perhaps cause some irritation: but, on the other hand, it is mentioned that Liveing constantly prescribes the salt and water q. s. in ointments, and this points to the contrary.—Amer. Drug. and Pharm. Rec., 1894.

Unguentum Plumbi Hebrae.—The mode of preparing the Unguentum Plumbi Hebrae, as prescribed by the Swiss Pharmacopœia, whilst being generally considered superior to that of the P. G. III., has been found unsatisfactory for small quantities of this ointment; and the following method, based upon employing freshly-prepared lead hydroxide, has been proposed as an improvement (Pharm. Centralh., 1894, 661): 34 parts of lead acetate are dissolved in water, and this solution is precipitated with 21½ parts of soda solution (specific gravity 1.33). It is best to precipitate the lead hydroxide directly in a tared plaster-pan and wash the precipitate by decanting. Forty parts of olive oil and 40 parts of benzoinated lard (10 lard to 1 ethereal tincture of benzoin [1 : 5]) are then added, and the whole boiled or heated in a steam-bath until the weight amounts to 100 parts. The entire produce can be completed within half an hour, it is stated.

Process for Preparing Light-Colored Wool-Fat has been patented by W. Kleemann. The more or less dark coloration of ordinary wool-fat is due to the presence of decomposition products of gluey and albuminous substances. Suitable agents for eliminating these foreign bodies from solutions of wool-fat in benzin or other fat solvents, are tannic acid, ortho-, pyro-, and meta-phosphoric acid, acetic acid or lead acetate, attended by the use of alcohol, either at the same time or consecutively added. These agents, if used separately, are very unsatisfactory for purifying, and it may be said, that first on the addition of alcohol a precipitate is formed, but, likewise, if alcohol would be used alone, no precipitates of aforesaid impurities would form, hence the importance of using them combined should without fail be observed. If the light-yellowish colored benzin solution separated from the precipitate, produced by phosphoric acid, etc., is now evaporated, a light-colored wool-fat will remain.—Pharm. Zeit., 1894, 622.

Aliphatic Acids of Lanolin.—By J. de Sauctis (Gazzetta 24, I, 14–28). Lanolin was treated with hot sodium ethoxide solution, and the sodium salts deposited were then extracted with ether to remove basic compounds.

The acids not volatile in a current of steam were found to be cerotic, palmitic, normal caproic and oleic acids. Those volatile in a current of steam were stearic, isovaleric, and normal butyric acids. The acids were separated by means of their lead salts and analyzed quantitatively.

Adeps Lanæ "N. W. K."—H. Beckurts (Pharm. Zeit., 1894, 325) upon a further examination of numerous samples of Adeps Lanæ "N. W. K," states that the results of these experiments were completely confirmatory of the assertion made in his former paper, that Adeps Lanæ answers all the requirements of the German Apothecaries' Union (Pharm. Germ., Ed. 1891). Contrary to the assertion of Liebreich, the quantity of free acid in both varieties is extremely small. If 2 Gm. of Adeps Lanæ are dissolved in ether, and the solution is then decomposed by the addition of two drops of phenolphthalein solution, 0.3 C.c. of a $\frac{N}{10}$ soda or potassa solution at most was required to redden it. According to Liebreich (Pharm. Zeit., 1893, 361), an essential difference between the Adeps Lanæ and the Lanolinum anhydricum is shown by the fact that the former turns to a more or less marked chestnut-brown color when maintained for half an hour at about a temperature of 110 degrees in the oil bath; while Lanolin does not change. The conclusion is drawn therefrom that Adeps Lanæ "N. W. K." is readily decomposable. Beckurts takes issue with Liebreich on this point; not one of the samples of Adeps Lanæ examined by him underwent the slightest change of color after being kept in the oil bath for half an hour at a temperature of 120 degrees.

In the third place it is stated that Adeps Lanæ "N. W. K." contains chlorine. Of course chlorine compounds are meant, since free chlorine or hydrochloric acid could not possibly be present. This being the case, all conclusions like those of Rothmann, which are based on the supposed presence of free chlorine, are manifestly incorrect, and are absolutely valueless in the consideration of the therapeutic usefulness of the Adeps Lanæ.—Amer. Drug. and Pharm. Rec., 1874, 63.

Detection of Adulteration in Lard.—Samelson.—A qualitative method for the detection of vegetable fats has long been a desideratum, and several such have been proposed, but neither Becchi's, Ganther's, nor Welman's can be depended on in all cases, the two former sometimes failing to give any indication in cases of undoubted falsification, whilst the latter may give as distinct a coloration where the purity of the sample is unquestionable, as in cases of adulteratiou. The iodine absorption remains at present the only trustworthy test.—Zeit. f. anal. Chem., 1894, 189.

Analysis of Lard.—G. Halphen.—In the analysis of lard, the presence of vegetable oils is readily detected by the present methods of analysis, but it is difficult to detect adulterations with beef and mutton suet. The authors find the separate determination of the iodine absorption of the separated liquid and solid acids from the lard to give good re-

sults. The liquid acids show an iodine absorption three to four times as great as that of the solid acids. The acids are separated by Lear's method by treating them in carbon bisulphide solution with zinc oxide.—Jour. Pharm. Chim., 1894, 241.

Detection of Cotton-seed Oil in Lard.—E. J. Bevan examined a sample of genuine lard, which, however, gave a decided silver reaction. By scraping off the top portion and taking a part of what lay underneath, to which the air had not penetrated, no silver reaction was obtained. The same result was obtained with bladder lard, and here the possibility of any mechanically deposited dirt being present was out of the question. Lard was then exposed in a still room in flat dishes, and, after a week's exposure, it gave the reaction quite strongly. The author can come to no other conclusion than that the effect observed is due to an oxidation process. After passing air for a few days through melted lard, a product was obtained which gave an intense reaction with silver solution. The substance formed is, no doubt, present in very minute amount, but there is quite enough to mislead and give the impression that cotton-seed oil is really present.—Analyst, 1894, 189; Jour. Chem. Soc., 1894, 335.

Metallic Ointment in Mercurial Ointment.—F. A. Sieker. (Pharm. Runds., 1895, 127) employs the following process for determination of the metallic mercury in mercurial ointment: Weigh exactly about 2 Gm. of ointment contained in a tared beaker. Warm gently so as to soften or melt the ointment, add benzin, and mix well by means of a glass rod. Let it stand for a moment to allow the mercury, which is in the form of a gray powder, to subside, and pour off the turbid benzin solution as far as possible. Repeat this process until all the fat has been removed, or until a little of the last washing no longer leaves a greasy stain on evaporation on paper. Then heat gently to evaporate the benzin that remains in the beaker, and weigh. Up to this point the mercury will remain in the form of a gray powder, but by a gentle tap on the beaker it will form a globule.

Any contamination with a powdered mineral could not unite to a globule of mercury. If metals are suspected with which mercury forms a liquid alloy, these may be detected in the usual analytical manner.

A commercial sample of ointment labeled 50 per cent. yielded 48 per cent. of mercury by this method.

Ointment of Mercuric Nitrate.—C. H. La Wall (Amer. Jour. Pharm., 1894, 525). The following fats have been suggested as a substitute for the lard oil: Neatsfoot oil, lard, butter, peanut oil, almond oil, castor oil, palm oil, bear's oil, ox marrow, beef suet, stearic acid, petrolatum, and almost all of the other fats from the animal and vegetable kingdoms, and even one from the mineral kingdom, appear to have been experimented with in the vain hope of finding some fat or oil which would make a good and durable ointment.

Several writers have taken another course and have tried to preserve the

products obtained from former processes. One advises keeping the ointment in a jar and covering it with a layer of glycerin to prevent oxidation; others have tried the addition of camphor; still others have given their attention to the mercurial portion of the ointment, and suggest making the nitrate from the oxide of mercury instead of making it from the metal. Some have even been skeptical as to the reliability of any process, but those who have approximated the truth more nearly are they who advise careful manipulation, especially as regards temperature.

The author employs the official ingredients and quantities and heats the lard oil to 100° C., removes heat, and adds the nitric acid without stirring, and reapplies heat when effervescence ceases until all gas is expelled. It is best to use a vessel of six times the capacity of the quantity to be made, to allow for the copious effervescence which takes place. When the foregoing mixture has cooled to 40° C., the solution of mercuric nitrate is added and the temperature is raised gradually to 60° C., and maintained until no further evolution of gas is noticed. If it is then agitated until cold, as usual, the resulting product will comply with the requirements of the Pharmacopœia.

Ointment made by the U. S. P. method, which has become spongy, may be remedied by elevating the temperature to 60° C., and cooling with agitation.

Petrolatum Molle.—L. F. Kebler (Amer. Jour. Pharm., 1895, 142) examined nine samples with the following results:

Description.	M. P. C.°	Sp. Gr. at 60° C.	Color of H_2SO_4.	Transparency of H_2SO_4.	Taste and Odor.	Saponifiable Matter.
Lily white ...	54	0.825	Brown.	Semi-transparent.	None.	None.
Snow white..	50	0.829	Brownish.	"	"	"
Snow white..	40	0.823	Light Brown.	Transparent.	Decided.	"
Cream white.	54	0.834	Brown.	Opaque.	None.	"
Pearl white ..	49	0.831	Brown.	"	"	"
Pearl white ..	47	0.827	Blackish Brown.	"	Some.	"
Pearl white ..	49	0.823	Brownish.	Semi-transparent.	None.	"
Light yellow.	48	0.830	Brown.	Opaque.	Some.	"
Light amber .	54	0.821	Blackish Brown.	"	None.	"

Each sample completely volatilized on platinum foil without any acrid vapors, was ointment-like in consistence, neutral and soluble in its various solvents.

Vaseline and Water.—Numerous methods of mixing vaseline with water are from time to time being published. The last one is by the addition of a small quantity of powdered gum arabic to the vaseline, by which means large quantities of water may be mixed in.—Brit. and Col. Drug., 1894, 261.

Testing Vaselin.—Crouzel & Dupin (Bull. Comm., 1894, 369) have ascertained by numerous comparative tests and by investigating falsifications of vaselin, that the sophistication of this product consists of the incorporation of fatty substances of vegetable or animal origin. The following is the authors' simple and rapid procedure to distinguish pure vaselin from such as is admixed with fatty substances of diverse origin: Add 5 drops of saturated potassium-permanganate solution, in distilled water, to 5 Gm. of the product to be tested, and triturate in a porcelain or glass mortar. If the vaselin is pure, the rose-red color will persist; if not, the permanganate is reduced, and the color becomes chestnut-brown, its depth being in direct ratio to the amount of admixed fatty proportions with the fat substances. Of course, sophistication may also be discovered by saponifying the foreign fatty substances; but this method takes longer time and is more complicated. If it is desired to transform this procedure of qualitative analysis into a quantitative one, it is only necessary to operate with a titrated solution of potassium permanganate, adding the latter until a permanent rose-red color is obtained. Proportional calculation will indicate the degree of purity of the tested product. The same procedure is applicable also to vaselin oil.—Merck's Mark. Rep., Jan. 1, 1895.

Vasogen.—G. Kottmeyer has examined Dahmen's vasogen, and finds that when heated on a water-bath it loses ammonia gas, and its power of emulsifying with water is simultaneously destroyed, but the latter is restored by passing ammonia gas into the oil after heating. Oleic acid was also found to be present to the extent of about 20 per cent., and a mixture of vaselin oil with 25 per cent. of crude oleic acid and 5 per cent. of absolute alcohol yielded, when saturated with ammonia gas, the counterpart of vasogen. Vasogen *spiss.* appeared to be a similar mixture of oleic acid with solid petrolatum or petroleum jelly, saturated with ammonia. Creosote vasogen can, therefore, be prepared at about one-fifth of the price of the factory-made preparation, as follows: Pure creosote, 20; white petrolatum oil, 60; common oleic acid, 20–25; ammonia gas, q. s.—Pharm. Post, xxviii., 68.

Unguentum Vegetabile or vegetable ointment is a recent edition to the emulsion-like bases, such as resorbin, Schliech's paste, etc., which have lately met with favor. The new ointment base is of German origin. It is a creamy, yellowish-white thin salve of a not disagreeable odor, which is composed of wax, oil and water. It dries rapidly on exposure to the air and, therefore, will be of service as a cooling application. It is incompatible with solution of subacetate of lead, nitrate of silver, and mercuric chloride.—Amer. Drug. and Pharm. Rec., 1894.

Aristol and Iodol Ointments are somewhat difficult to prepare, the two bodies not mixing readily with fatty substances. The Moniteur de la Pharmacie says a very satisfactory ointment may be produced if the iodol

or the aristol be first triturated with a few drops of ether.—Rép. de Phar., 1894, 358.

Mineral Wax from Kaluga.—W. Alexeéff.—This new substance, presenting the external characteristics of ozokerite, was found in the peat of the Russian province of Kaluga. It is almost insoluble in alcohol and benzene. Its specific gravity is 0.950, and its melting point between 64° and 65°. Analysis yielded $\overset{\text{C.}}{75.5}\ \overset{\text{H.}}{12.5}\ \overset{\text{O.}}{12.0.}$ On distillation, water was formed, and a liquid with a specific gravity of 0.786 and a boiling point of 240°; analysis gave C = 83.4; H = 13.8 per cent.—Jahrb. f. Min., 1894, 231; from Verhand. Russ. Kais. Min. Ges., St. Petersburg, 29, 201.

VINA.

Determination of Volatile Acids in Wines.—E. Burcker has found experimentally that the fixed acids, free or combined, exert at most only a negligible action upon the acidity of the distillate, which is due merely to the volatile acids, among which the acetic acid takes the principal work. The maximum limit of volatile acidity in sound French wines does not exceed 0.70 Gm. per litre, calculated as SO_4H_2. For the wines of Algeria and Tunis it may rise to 1.60 Gm. per litre.—Compt. rend., 1895, No. 22.

The Acid Constituents of Wines.—P. L. Aslanoglon reviews the literature and suggests methods for estimating the nature and quantity of the different acids present.—Chem. News, 1894, 176.

Testing of Boric Acid in Wine-ash.—P. Kulisch recommends simply dissolving the ash in a few drops of hydrochloric acid, and testing with turmeric paper of a decided yellow color. The test is then much more satisfactory.—Zeit. f. angew. Chem., 1894, 147.

Estimation of Alcohol in Wines.—A. Borntraeger dilutes 100 C.c. of the sample with an equal bulk of water, distills off two-thirds or more, dilutes the distillate to exactly 100 C.c., and takes the sp. gr. at 15.5°. Unless the sample contains more than 0.5 per cent. of volatile acidity, which is rarely the case, it is not necessary to neutralize before distillation.—Zeit. f. angew. Chem. 1894, 108.—Jour. Chem. Soc. (Abst), 1894, 259.

Losses Attending the Determination of Glycerin in Wines and Hydroalcoholic Liquids.—The methods usually employed for the quantitative estimation of glycerin is that of Reicharts, which consists in evaporating the wine or fluid to dryness with a slight excess of slacked lime; the glycerin is extracted from the residue by washing with a mixture of alcohol and ether, filtering and evaporating the solution. P. Kulisch (Chem. Zeit. No. 23, 1894) has studied the various sources of error arising in this method of determination. First, he estimates the loss of glycerin which takes place in the evaporation of the alcoholic solution, which he finds to be from 3.3 to 7.7 per cent.; if the alcohol is removed by distillation, the loss arises to 13.7 per cent. A second loss arises through the difficulty en-

countered in extracting all of the glycerin from the lime residue, particularly in such samples of wines or fluids which contain sugar. In such instances a large amount of lime should be employed, in order that sufficient excess may be present to combine with the sugar, otherwise the latter will be taken up along with the glycerin. For samples which contain less than 3 per cent. of sugar to 2 Gm. of extractive, the author recommends the employment of 1.5 Gm. of calcium hydrate; and the use of not more than 25 C.c. of alcohol-ether for extraction of the glycerin, otherwise too much of the extractives is liable to be taken up.

Kino in Wines.—Kino has of late risen to the unusually high price of about 14s. per lb., in consequence of the demand that is stated to have arisen for it in giving color and "edge" to port and Burgundy wines. As a consequence of its scarcity other varieties of kino are coming into the market, notably Bengal or pulas kino (Butea frondosa), which is distinguished by having particles of bark always attached to it and by its ruby color. African or Gambia kino (Pterocarpus erinaceus) has also been imported. It is smaller, brighter, and of a more purplish red than ordinary kino. This kind is the original kino, deriving its name from the African name of the tree "kano," and its importation appears to date from about the year 1811. It is somewhat singular that it does not more frequently enter commerce, since the tree grows from Senegambia to Angola, and the tincture of this kino has the reputation of not becoming gelatinous when kept.—Pharm. Jour. Trans., 1895, 646.

Separation of Salicylic Acid from Wine.—E. Claasen states that after acidifying the wine with dilute sulphuric acid, it suffices to agitate with a mixture of sulphuric ether and petroleum ether. The author used a mixture of equal volumes of the two ethers, having specific gravity of 0.670, and obtained the salicylic acid in so pure a state that the iron chloride reactions could be had at once. The separation of the etheric stratum from the wine was sharp and immediate, something that does not occur in any of the methods hitherto in use. Evaporation of the wine prior to the addition of the ethereal mixture is unnecessary, as the separation of the latter occurs the more sharply and readily in direct proportion to its specific gravity.—Pharm. Rundschau, 1895, 38.

Ratio of d-Glucose to Levulose in Sweet Wines and Honey.—J. König and W. Karsh. The proportions of the two sugars were estimated both by the method of Soxhlet and that of Neubauer, the results of which agree closely in the case of wine and must. In unfermented must, the d-glucose was found to exceed the levulose in the ratio of 100 : 77–84. Fermentation, whether natural or induced by the addition of yeast, removed the d-glucose more rapidly than the levulose, so that the proportions speedily became inverted. Cane sugar added to wine is inverted by the acids present, and the fermentation of the two glucoses produced, follows the same course as

in natural wine. The only conclusion derived from the research is that if a sweet wine contains considerably more levulose than d-glucose, it is probably a fermented wine; if, on the other hand, the d-glucose preponderates largely, it is likely that no fermentation has taken place.

For the examination of honey, it is necessary to remove the dextrinoid substances. For this purpose 40 Gm. of honey is diluted with water to 40 C.c., and 20 C.c. of this mixture is slowly made up to 250 C.c. with absolute alcohol. After 2 to 3 days the solution is filtered from the precipitate, and portions of it are used (after expulsion of the alcohol) for the titrations and polarization. In the case of honey, Neubauer's method gave results differing widely from those of the Soxhlet-Sachsse titrations, the divergence being greatest in those samples (of honey from flowers) which gave the largest amount of precipitate with alcohol. It must, therefore, be assumed that honey contains constituents possessing reducing powers and optical properties which differ from those of d-glucose and levulose, and, in particular, that a strongly dextrorotatory substance is present. The ratio of d-glucose to levulose, as estimated by titration, varies largely in different specimens of genuine honey, so that as much as 25 per cent. of starch sugar might be added to certain samples without exceeding the proportion of d-glucose found in others. All the natural honeys examined (including that from conifers) show, however, laevorotation after removal of dextrin. Dextrorotation under these circumstances would indicate the addition of starch sugar.—Zeit. f. anal. Chem., 1895, 1.

Estimation of Wine.—The Austrian Alimentary Code, which relates to the analyses and estimations of wines, permits the following substances to be added before or after fermentation: (*a*) Grapes fresh and dried, or their juice. (*b*) Alcohol pure, and some cognac. In grape wines the quantity of added alcohol must not exceed 2 per cent., and the total quantity of alcohol must not be more than 16 per cent. by volume. The following wines are exceptions to this: Old Tokay, 18 per cent. (Sweet Tokay, 16 per cent.); Malaga, 18 per cent.; Greek, Cyprian, Asiatic, Californian and Cape wines, 20 per cent.; Australian, 21 per cent.; Port, 23 per cent.; Sherry and Marsala, 25 per cent. In Sicilian wines the maximum of 27 per cent. is quite exceptional. (*c*) Cane sugar and invert sugar. (*d*) Pure carbonic acid. (*e*) Pure calcium carbonate. (*f*) Clarifiers not injurious to health, such as tannin, egg albumen, etc. Substances prohibited are: Alumina and magnesia preparations, sulphites, mineral acids, coloring matters from tar and other foreign materials, glucose, molasses, cane and invert sugar (impure), impure alcohol, salicylic acid, glycerin, aromatic bodies and substances injurious to health.

In judging as to the purity of a wine of a special vintage it is necessary to base one's conclusion on the analysis of wines from the same district and of the same age.

Extract.—Wines completely fermented should yield at least 14 Gm. per

liter. Those containing less than that amount are to be suspected unless it be found normal for wines of the same kind and age. After removing the fixed acids the residue should still be 11 Gm. per liter.

Mineral Matter.—At least 1.3 Gm. per liter in normal wines.

Ash.—Should not, as a rule, exceed $\frac{1}{10}$ of the total extract.

Glycerin.—The relation to the alcohol is from 7 to 14 per cent.

Free Acid.—In natural wines, containing about 8 Gm. of acid per liter, the proportion of free tartaric to the fixed acids is as 1 to 5 or 6.

Sodium Chloride.—Not more than 0.05 Gm. per 100 C.c., unless the wine come from a district with soils rich in chlorides.

Sulphuric Acid.—0.92 Gm. of SO_3 per liter is the usual maximum.

Phosphoric Acid.—In certain cases gives useful indications, *e. g.*, in the case of medicinal wines (Austrian and Hungarian *vins de santé* contain at least 0.6 Gm. P_2O_5).

Nitrogen.—According to researches made at Klosterneuberg experimental station, natural wines rarely contain less than 0.07 Gm., or more than 0.08 Gm. per liter, though in certain isolaed cases it has been found as high as 1.35 Gm. Less than 0.07 Gm. is suspicious.

Nitric Acid.—Only suspicious when the diphenylamine reaction is very marked.

Sulphurous Acid.—According to the medical faculty of the University of Vienna, a wine containing more than 0.008 Gm. per liter is to be condemned.

Most of the preceding estimations are made by the usual methods, and the only points calling for special notice are the determination of the extract and the search for foreign coloring matters. In wines containing up to 3 per cent. of extract, 50 C.c. are evaporated on the water-bath in a platinum basin, and dried for two and a half hours. Those richer in extract are diluted until they do not contain more than 3 per cent., and treated in the same way. In the case of sweet wines it is preferable to obtain the extract from the specific weight, for which purpose Balling's table is serviceable.

In examining for vegetable coloring matters, the wine is treated with an excess of lead acetate.

The color of the precipitate obtained with natural wines is bluish-gray to bluish green. With the coloring matter of the filtering a mauve color is obtained, and with that of the elder a greenish tint. With the coloring matter of the leaves of Quercus coccifera the color is reddish violet. In searching for coal tar colors the lead acetate precipitate is filtered, the filtrate agitated with amyl alcohol, and the colored amyl alcohol solution examined: 100 C.c. of wine should be used, and 30 C.c. of lead acetate.—Analyst, May 1895.

Formation of Mannite in Wines.—H. and A. Malbot.—After having effected a rapid and complete fermentation of the must, the formation of mannite may be prevented, if required, by energetic sulphuring.—Bull. Soc. Chim., vols. xi.–xii., No. 9.

Wine of Coca.—Bodo Lorentz recommends the following: Heat 4½ gals. of good Californian burgundy wine to ebullition as quickly as possible in a vessel provided with a well-fitting cover and of the capacity of about 8–10 gals., and set aside to cool. The original volume of 4½ gals. is then restored by the addition of alcohol, and ½ gal. of good sherry wine is further added. When the liquids are well mixed half of the quantity is poured over 4 lbs. of coca leaves reduced to a No. 40 powder and placed into a glass vessel that can be well stoppered. Digestion is then allowed to go on for five days, with frequent shaking. Separate the wine by straining from the coca powder, and pour over the latter the second half of the menstruum. The first extract is reserved. After three days strain the second infusion, under pressure, through a cloth. The two extracts are now mixed, set aside to settle for 24 hours, and filtered. Coca wine thus prepared will keep without any change for years, if preserved in well corked bottles.—Merck's Market Report; West. Drug., 1894, 419.

Malt-Wine.—Natural malt wine, which has attracted some attention as a nutrient and restorative, resembles in strength, sweetness and taste sherry, madeira, malaga, or tokay, according to the manner in which it is prepared. All the varieties are clear, strongly alcoholic, and free from any unpleasant taste. As far as its origin is concerned, malt wine may be considered a beer, but in its constituents and properties it is to be regarded as a wine. It is made as follows: Ground malt is mixed with water and carefully heated. To the liquor obtained by pressing, a pure culture of the lactic acid ferment is added in order to give the necessary acidity. It is then fermented by carefully selected and cultivated wine yeast at the usual temperature. After the production of the alcohol, which can be increased by the addition of cane sugar, the wine is freed from every trace of the odor of malt by allowing it to remain for several weeks in contact with air frequently renewed. It is then racked off into barrels and allowed to ripen. The wine thus prepared contains 11.5 to 15 per cent. of alcohol, 11 to 25.5 per cent. of extractive matter, 0.06 to 0.15 per cent. of phosphoric acid, and 0.7 to 1.5 per cent. of total acid.—Zeitschr. f. Krankenpfl. and Pharm. Zeit., xl., 390; Pharm. Jour. Trans., 1895, 1196.

Pepsin Wine—This preparation is official in the German Pharmacopœia, glycerin being employed as a preservative. In the second edition of that work the formula was as follows:

Pepsin	50 Gm.
Glycerin	50 Gm.
Water	50 Gm.
Acid hydrochloric	5 Gm.
White wine	1845 Gm.

That in the later edition, however, is different, being:

Pepsin	24 parts.
Glycerin	20 parts.
Acid hydrochloric	3 parts.
Water	20 parts.
Syrup	92 parts.
Tincture of orange	2 parts.
Sherry wine	839 parts.
Or enough to make 1000 parts.	

The first four ingredients are directed to be mixed together and allowed to stand eight days, Filtration is then performed, and the other ingredients are added. Schmiedeberg objects to the addition of glycerin as being injurious, and other writers have objected to the use of wine, alleging that the alcohol present might hinder the action of the ferment, though no satisfactory evidence appears to have been produced on either of these points. The addition of syrup is strongly recommended by several of these individuals, but a writer in the Bull Pharm. de Bruxelles suggests that the proportion of syrup should never exceed 20 per cent., as it may check the digestive action of the pepsin, Vulpius having shown that whereas albumin 10 Gm. may be digested in one hour by pepsin 0.10 Gm. in the presence of hydrochloric acid, 10 drops, diluted with water, 100 Gm., the addition of sugar, 10 Gm., prolongs the period of digestion one to five hours. The presence of alcohol, 1 Gm., or sweet wine, 4 Gm., prolonged the period to one hour and twenty minutes only.—Pharm. Jour. Trans., 1894.

Wines of Quinia.—The following are Dieterich's formulas:

1. Without sweetening, from the tinctures:

Gelatin	1 part.
Distilled water	10 parts.

Dissolve by the aid of heat (after letting stand until the gelatin has swollen) and add

Sherry, or red wine	800 parts.
Tincture of cinchona	200 parts.

Set aside for eight days in a very cool place, shaking frequently in the meantime, and finally filter.

2. Sweet, from the tincture:

Proceed as above, except that only 600 parts of wine are to be used, and 200 parts of simple syrup are added.

3. Without sweetening, from the bark:

Dissolve gelatin in water, as before, and to the solution add 1050 parts of sherry, or red wine, according to taste or circumstances. To the liquid add 40 parts of cinchona bark in No. 50 powder, and digest for

eight days, with frequent agitation. Decant the clear liquid and press out the residue. Let stand in the cellar, or in a cool place, for eight days, and then filter.

4. Sweet, from the bark:

Proceed as in No. 3, except that you use only 900 parts of wine and then dissolve 100 parts of powdered sugar in the liquid.—Phar. Era, 1895, 44.

Oenoglucose is a new grape sugar prepared in France, which is of a high degree of purity, that is comparatively free from intermediate dextrin-like products. It is proposed that oenoglucose be used in the fortification and in the artificial production of wines.—Amer. Drug. and Pharm. Rec., 1894.

Proceedings of State Pharmaceutical Associations.*

FLORIDA.

Proceedings of the Florida State Pharmaceutical Association at its 8th Annual Meeting.—Held at Tampa, May, 1894. Contains an account of the Proceedings, with Pharmacy Law; also the following papers:

The Saw Palmetto.—J. Marion Dixon prepares the fluid extract from the fresh and selected parts with 95 per cent. alcohol. In preparing the syrup the juice from which the oil is separated is evaporated to a syrup. The oil is used in the form of an elixir and in a saccharated powder form, and in suppositories for uterine troubles.

Druggists' Associations.—J. D. Palmer.

GEORGIA.

Proceedings of the Nineteenth Annual Meeting of the Georgia Pharmaceutical Association.—Held at Americus, May, 1894.

Patent Medicines and Ready-Prepared Pharmaceuticals.—J. P. Turner considers that a law compelling the printing of the formula on the label would enhance the legitimate drug business.

Pharmacist and Physician in their Duties to Each Other.—C. M. Crosby considers them as brothers in a good calling.

Syrup of Iron Iodide.—J. W. Goodwyn says that it can be made from the liquor or solution of iron iodide on the market, and believes the permanence of the solution to be due to the addition of hypophosphorous acid.

The Advance of Pharmacy.—S. C. Durban.

*This portion of the Report is dependent upon the publications of the State Pharmaceutical Associations. Omissions result when the Reporter has not received these publications.

Whither are We Drifting?—Harry Sharp urges the retail pharmacist to infuse his own individuality as against that of the manufacturer. Physicians should be shown the U. S. P. and National Formulary while they are in the store and not busy.

INDIANA.

The *Indiana* Pharmaceutical Association met at Evansville. The following papers were read: "The New Pharmacopœia," Leo Eliel; "The Alcohol Molecule," J. N. Hurty. Several valuable and interesting reports were read, and Louis Diehl addressed the meeting on the subject of the National Formulary. He outlined the history of this publication, and related how a plan had been devised by the Kentucky Pharmaceutical Association to make the use of the Formulary more popular among druggists of that State. This plan consisted in having members make preparations in strict accordance with the Formulary and present them at the meeting of the K. P. A.; these were to be examined by a committee and then presented and explained by this committee, at a meeting of the Kentucky Medical Association. The suggestion had been carried out to the letter, some 65 to 70 members having submitted samples. When presented at the meeting of the Medical Association, they attracted more attention than anything else on the programme.

KENTUCKY.

Proceedings of the Seventeenth Annual Meeting of the Kentucky Pharmaceutical Association.—Held at Paris, May, 1894.

The Louisville Botanical Club.—Addison Dimmitt reports as follows regarding this organization:

At the organization of our club the two following rules were adopted, from which we have never deviated:

1. Never to permit anything sectional or political to enter into our motives or conduct.

2. Nothing may be added to our price schedule except that which has a fixed retail price—or, in plainer words, we aim only to control the prices on patent or proprietary preparations and mineral waters.

Our schedule of prices is based on the cost of the preparations, with few exceptions—which are noted in our published list. It gives the price on a single package, or three or six of the same kind. All soaps and perfumes are excluded from this list, as they are sold by dry-goods houses. We have succeeded in establishing fixed prices with these dry goods people on such goods; and though the prices are not full, yet they still leave the druggist, who may meet them if he desires, a small profit.

We have a list of mineral waters, covering every kind on the market, with price to the customer by bottle or by the dozen. This we have found very convenient. It enables us to avoid carrying an excessive

stock, and we can price the goods to customer and furnish the same in an hour's time.

We have also adopted several other plans which have proved most excellent. They are as follows:

Night Calls.—The following card was sent to all our druggists:

> After July 1st, 1893,
> the lowest charge that will be made for
> NIGHT CALLS
> will be twenty-five cents.
>
> This action is concurred in by the entire membership of the Louisville Botanical Club, which represents all the druggists of Louisville.

With this card the following explanation was sent:

> NOTE.—The object of this card is to do away with unnecessary and unprofitable night-work; it will educate the public to the fact that a druggist must not be called except in emergencies. In case of charity and distress, the humane spirit of our profession has the right to assert itself regardless of any restrictions.

Botanical or General Trademark.—The following explains itself:

> Tack this up on your prescription case:
> B. O. T. A. N. Y. C. R. E. W. X.
> 1 2 3 4 5 6 7 8 9 0 Repeater
> .....
>
> This is to be used when asked to price a prescription, with the possibility of its being taken elsewhere, and when giving copies.
>
> Always put an X under the price-mark, thus: $\frac{\text{Tn}}{\text{X}}$ —
>
> which will indicate at a glance that it is the Botanical or general trade-mark.

The object of this is to do away with the practice of "shopping" with prescriptions. It is a very simple method and is thoroughly appreciated by our members. By its use we are saved both embarrassment and money.

Its effect on the public is good, as it increases their respect for us and our profession.

Discount to Physicians of 20 per cent.—This was adopted by the club to prevent any possible confusion or misunderstanding between our members. It applies only to regular practicing physicians and dentists, and only on the sale of patent or proprietary preparations.

Dead Stock.—A list of unsalable patent or proprietary preparations is sent to our secretary, which he fills for the convenience of any member who may have a call for an old preparation. The idea is good and practical, and every druggist avails himself of it.

The most important factor in the success of our organization is committee work, both standing and special.

[The organization and work of this club is worthy the special attention of all associations.—REPORTER.]

Facts from the Prescription File.—C. S. Porter reports, on investigation of the prescription files in five of the cities of the State, representing its different sections, that about 27 per cent. of them called for proprietaries.

Artificial Effervescent Carlsbad Salt.—C. J. Albers commends the N. F. preparation, and claims that it may be manufactured at 40 cents per pound or less.

The Microscope in Pharmacy.—L. Rominger claims the microscope to be indispensable in having the drug stock in good condition.

Syrup of Hydriodic Acid.—Oscar C. Dilly remarks on the value of the U. S. P. process and says that physicians should avoid specifying the make of any manufacturer.

Glycerin, its Impurities and Tests.—G. Holzhauer claims that the $AgNO_3$ test is most reliable, and glycerin that is fit for use should show no reaction with this salt.

Creosote of Commerce.—G. Holzhauer says that if any liquid assumed to be creosote dissolve largely in glycerin it probably consists in the whole or in large part of carbolic acid. Much of the creosote sold is nothing more than impure carbolic acid.

Emulsion of Cod Liver Oil.—G. Holzhauer recommends the following:

Cortex saponariæ	℔ iv.
Chondrus	℔ ii.
Oleum morrhuæ	Cong. iv.
Oleum gaultheriæ	ʒ ss.
Oleum amygdalæ amaræ	ʒ ii.
Calcium hypophosphite	ʒ viii.
Sodium hypophosphite	ʒ iv.
Saccharine	ʒ ss.
Aqua q. s. ut. fiat	Cong. xvii.

Exhaust the cortex saponariæ by percolation with a quantity of hot water, and evaporate to 4 pints. Dissolve the hypophosphites in 8 gallons of hot water, add chondrus, boil about 7 minutes, strain through flannel without pressure, then add water q. s. to make 6 gals. Put 6 pts. of the mucilage in a churn, work it for a few minutes, then add 2 gals. of cod liver oil and the following flavoring oils, keeping this well mixed; then add 45 ozs. of soap bark infusion with alternate portions of oil until all is added; finally, add balance of chondrus mucilage, then add saccharine, which has previously been dissolved, keeping it well mixed, then strain through flannel.

LOUISIANA.

The Louisiana Pharmaceutical Association convened in New Orleans and the paper that attracted some attention was upon "Pharmaceutical Specialties as Prepared by Manufacturing Chemists," by M. T. Breslin. It was construed as an attack upon the manufacturers of drugs and chemicals—many of whom are supplying goods of inferior quality.

MASSACHUSETTS.

The Massachusetts Pharmaceutical Association met at Worcester, Mass., June 26–28. C. F. Nixon delivered "A Talk on the Medicinal Plants Indigenous to Massachusetts." Papers were read by W. L. Scoville, on "Chalk Mixtures;" F. T. Drake, on "Adulteration of Powdered Nux Vomica;" John H. Manning, "How to Keep an Index;" E. L. Patch, on "Trouble and Loss in Storing Stock;" and "Question Box."

MICHIGAN.

Proceedings of the Michigan State Pharmaceutical Association at its 12th Annual Meeting.—Held at Detroit, Mich., Sept., 1894.

Report of Committee on Adulteration.—They report the adulteration of ipecac with an unknown root. Two samples of KBr contained considerable amounts of sulphate. A sample of Copaiba from Aspinwall was inferior in resinous properties. A sample of wine contained no alcohol. One sample of gold foil contained all copper and not so much as a trace of gold. A number of fixed and volatile oils were examined and found to be adulterated. Powdered rhubarb was adulterated with turmeric. Ground cinnamon was found to be cassia. 5 Samples of ground ginger were impure, containing starch, turmeric, mustard hulls, etc. Powdered capsicum showed evidence of mustard hulls. A sample of Soc. Aloes was somewhat deficient in aloin.

Old Extract of Nux Vomica and Process of Assay.—F. A. Thompson obtained the following percentages of alkaloids by the two processes of assay:

	By Extractor.	By U. S. P. Process.
A	2.65	2.70
B	0.60	0.55
C	1.56	1.62
D	1.80	1.85
E	1.37	1.40
F	1.50	1.51
G	2.10	2.18
H	1.52	1.49

Aloin.—A. W. Epley examined six commercial samples. All were from Barbadoes aloes, and required from 2 to 5 times as much cold water for solution, as directed by the Pharmacopœia.

Purity of Morphine Obtained in the Assay of Opium.—D. O'Connor presents the results of assay of five different samples of opium, also the results of analysis of the crystals of morphine thus obtained. While some samples show an impurity of 1 Mgm. of alkaloid, others again show a corresponding gain. We might look upon this either as an experimental error, or that the impurity in the morphine crystals is sometimes of such a nature as to neutralize, or take up in some other way, a small quantity of sulphuric acid.

Sample.	Per Cent. of Morphine.	Taken for Titration.	Found as $C_{17}H_{19}NO_3$, H_2O.	Found as $C_{17}H_{19}NO_3$.
I	13.71	*a*. .300	.2970	.2794
		b. .300	.2973	.2796
I	13.72	*a*. .300	.2975	.2978
		b. .300	.2973	.2796
II	14.81	*a*. .300	.2977	.2800
		b. .300	.2975	.2794
II	14.78	*a*. .300	.2975	.2794
		b. .300	.2980	.2803
III	15.19	*a*. .300	.3026	.2846
		b. .300	.3021	.2842
III	15.16	*a*. .300	.3017	.2838
		b. .300	.3023	.2844
IV	13.91	*a*. .300	.2975	.2794
		b. .300	.2985	.2808
IV	13.78	*a*. .300	.2970	.2794
		b. .300	.2977	.2800
V	12.98	*a*. .300	.3001	.2823
		b. .300	.2919	.2706
V	12.95	*a*. .300	.2960	.2784
		b. .300	.2985	.2808

Control Test of the U. S. P. for Tincture of Opium.—G. E. McNoah gives the following table to show the amount of morphine recovered from the tinctures made from the different samples of opium:

Samples.	Per cent. of Morphine in Drug.	Per cent. Recovered in Tincture.	
1	13.72	.9002	1.105
2	15.2	1.319	1.317
3	14.98	1.247	1.1964
4	14.24	1.2028	1.301
5	13.56	1.1096	1.257

From these results the writer draws the following conclusions: 1. If the tincture be accurately and carefully prepared, nearly all the morphine is exhausted by the menstruum directed in the method outlined in the Pharmacopœia. 2. The Pharmacopœia method of assaying mixture of opium gives results which are very nearly the truth.

Hydrocyanic Acid.—C. E. Barnhardt examined a number of samples, obtained from wholesale dealers, and found all to assay 2 per cent., with the exception of one which was in a common white bottle with a porous cork and not sealed in any way, which assayed 1 per cent. Out of 50 analyses of retail products they assayed 0.4 to 2 per cent.

Pharmacy in Germany.—The number of students of pharmacy in a German university is small when compared with numbers in medicine or law, or with the total number of students. Below is given the present number of the students of pharmacy in some of the universities, less than half of those in Germany, with numbers in medicine and in total for comparison.

	Pharmacy.	Medicine.	All Studies.
Berlin	139	1,059	4,025
Freiburg (Baden)	70	338	1,040
Halle	17	234	1,654
Heidelberg	14	218	1,123
Göttingen	16	192	798
Kiel	17	319	704
Leipsig	116	788	3,518
Marburg	102	213	807
Munich	273	1,114	3,408
Strasburg	38	304	979

Special importance is placed upon analytical chemistry and upon organic chemistry in the university studies of pharmaceutical students. They are engaged in the chemical laboratory a good part of every day throughout their residence at the university. They are well trained in botany. In most of the universities good provision is made in pharmacognosy, and it is the desire of the German pharmacists that this branch

shall be under a professor who has been a practicing apothecary. A distinct course of lectures in pharmaceutical chemistry is generally given.

MINNESOTA.

Proceedings of the 10th Annual Meeting of the Minnesota State Pharmaceutical Association.—Held at Lake Minnetonka, June, 1894.

The College of Pharmacy of the University of Minnesota.—An historical paper by F. J. Wulling which also contains a summary of the College during the past year.

Elixir of Phosphate of Iron, Quinineand Strychnine.—C. T. Heller. (See Elixirs.)

MISSOURI.

The Missouri Pharmaceutical Association held its annual meeting at Excelsior Springs. Among the papers read were the following: "The Practical Value of a Drug Journal," by A. N. Doerschuk; "Aromatic Syrup of Licorice," by H. S. Hassebrock; "Report of the Research Committee B of the U. S. P. Committee," by Charles O. Curtman; "Fifty Observations for Pharmacists," by H. M. Whelpley; "The Practical Value of a Drug Journal," by Ambrose Mueller; "Some Incompatible, Explosive and Questionable Prescriptions," by James Good; "Report on Cantharides," by A. Brandenberger; "Report on Volatile Oils," by C. C. Hamilton; "What is a Poison?" by A. N. Doerschuk; "A Few Paragraphs on Pharmacy from an Introduction of Liebig's Chemistry Published in Heidelberg, Germany, 1843," by Ambrose Mueller; "A Medicinal Dynameter," by H. M. Whelpley; "Doses for Pharmacists," by the same.

Report of Committee on United States Pharmacopœia.—By C. O. Curtman.—"The writer has the honor to report the following in regard to the United States Pharmacopœia:

The committee elected by the national convention for revising the Pharmacopœia, held in Washington, D. C., in May, 1890, has during the past year completed the work of the seventh revision intrusted to it, and in August, 1893, the first copies of the work were exhibited at the meeting of the American Pharmaceutical Association at Chicago, and an edition of 8,200 copies was placed upon the market. This supply was soon exhausted and was followed by a second edition of 5,000 copies, and again, in 1894, a third edition of 5,000 had to be printed, and a large portion of these are already sold.

Altogether the reception of the work has been a favorable one both at home and abroad. Criticisms have been published in a number of journals, some of them censuring the Committee of Revision for introducing or omitting features which were not in the power of the committee to control, as their action was limited by the instructions of the convention which elected the committee. Among the omissions especially censured was the

non-introduction of a number of modern synthetic chemicals, such as antipyrin, phenacetin, sulfonal, etc, etc., which are received into European pharmacopœias. Many of the members of the Committee of Revision were in favor of their admission, but the stringent rule, number 6, adopted by the convention, forbade this, and the only remedy for those who wish such preparations introduced will be that the delegates to the next convention give greater liberty of action to the committee they may then elect.

Another objection dwelt on by some critics was the failure of stating the doses of the remedial agents, or at least the maximum doses of very active and poisonous preparations. This question was also under discussion in the convention, and though no formal restriction was placed upon the Committee of Revision, the sentiment expressed in the convention was so unfavorable to the introduction of doses that it was not deemed prudent to contravene it.

As in all large publications, a number of misprints have happened, and have been discovered too late for correction in the plates for the first edition. The plates have at once been corrected, so that the errors are eliminated from the later copies.

Since the publication of the Pharmacopœia the Committee on Revision has not been idle. Its active chairman, Charles Rice, with the consent of all the members, has organized "Research" committees to engage in preparatory work in aid of the next revision. Thus far four such committees have been organized.

Research Committee A. Subject, The feasibility of devising practical methods of assay for drugs containing no sharply defined proximate principles capable of being separated in a sufficiently pure state (such as ergot, digitalis, rhubarb, etc.).

Chairman: W. M. Mew.

Research Committee B. Subject, Revision of the description and tests of inorganic chemicals, including salts of inorganic bases with organic acids. Revision of the volumetric assays of the U. S. P. Study of the proper limits of purity or strength of chemicals, now official or likely to become so hereafter.

Chairman: Charles O. Curtman.

Research Committee C. Subject, Inquiry into the feasibility of incorporating into the U. S. P. methods of identifying such drugs as may be found to permit of it, in a powdered condition.

Chairman: H. H. Rusby.

Research Committee D. Subject, Revision of the description and tests of organic chemicals.

Chairman: Charles Rice.

The members of these committees are to be selected hereafter, and other committees are to be organized as occasion may arise.

The results of the researches of these committees are to be reported to

the whole Committee of Revision, and may be published by the authors, provided they state that the papers are reports of U. S. P. Research Committees. This will secure to the profession an early knowledge of these researches, and an opportunity to repeat the experiments and verify or controvert them.

In conclusion the undersigned would urge this association to take early action in considering all matters connected with the next revision of the U. S. Pharmacopœia. Neither the pharmaceutical nor the medical profession is likely to lag behind in the progressive spirit of the age. New methods are being introduced requiring new agents of medication, obsolete preparations are discarded, other standards of strength or purity may become advisable, and all of such matters require careful study and discussion, and should not be left to be decided at the last moment in a pharmacopœial convention.

The wishes of this State association should be clearly ascertained in regard to the admission or rejection of certain preparations, in regard to inserting the doses of actual remedies, the processes of manufacture or assay of galenical preparations, and other matters connected with our national Pharmacopœia, so that when the time comes to select delegates, they may be apprised of the wishes of the profession, and not left to their personal impressions and the impulse of the moment when called upon to cast their vote for the rules guiding the next Committee of Revision.

NEW YORK.

Proceedings of the 16th Annual Convention of the New York State Pharmaceutical Association.—Held at Saratoga Springs, June, 1894. Contains Constitution, By-Laws, Roll of Members, and the following papers:

Report of Committee on New Remedies.—A condensed and valuable report on the newer synthetic products.

Report of Committee on Adulteration.—One of the most interesting events of the year was an attempt to introduce into the United States from England a sample of asafetida containing about 15 per cent. of gum. Ipecac root has been sent adulterated with other roots and a superabundance of stems. Among products examined were liquors, mustard, rhubarb, ginger, capsicum, dandelion, the following diluted acids: acetic, hydrochloric and sulphuric, aromatic sulphuric acid, water of ammonia, stronger ether, compound spirit of ether, tincture of iodine, compound solution of iodine, magnesia, creosote, etc., and some proprietary articles.

The Rubber Industry in South America.—H. H. Rusby. An illustrated article dealing principally with the Hevea variety of the Madeira and its tributaries, especially the Beni.

The following is a list furnished by Wm. H. Rudkin, of New York City, which is supposed to comprise all of the orders and genera known up to the present time to yield commercial India rubber:

Euphorbiaceæ.—Hevea braziliensis, Mull.; H. spruceana, Mull.; H. discolor, Mull.: H. pauciflora, Mull.; H. rigidiflora, Mull.; H. Benthamiana, Mull.; H. lutea, Mull.; H. guyanensis, Mull.; Micranda siphonoides, Benth.; M. minor, Benth.—the caoutchouc derived from all these species is known commercially as Para rubber, from the principal shipping point. They are all natives of the Amazon and Guiana. Manihot Glaziozii, Mull. —the source of Ceara rubber, native of the Rio Janiero district.

Urticaceæ, Tribe Artocarpeæ.—Ficus elastica, Roxb.; F. hispida, L.;—East India rubbers, natives of Assam. F. Brasi, R. B.;—Sierra Leone, African rubber. F. macrophylla, Desf.; F. rubiginosa, Desf.—Australian rubber, natives of Northern Australia. Urostigma Vogelii, Miq.—African rubber, native of Liberia. U. loccifera, Miq.—East India rubber, native of Assam. Castilloa elastica, Cervant; C. Markhamiana, Collins—these trees are the sources of all the various Central American and Western South American rubbers.

Apocynaceæ.—Hancornia speciosa, Gom.—native of Pernambuco; Willoughbii edulis, Roxb.; W. firma, D. C.; W. martobanica, D. C.—natives of Madagascar and India; these are held as high grades of rubber. Landorphia owarensis, de Beauv.; L. florida, Benth; Vehea madagascariensis, Boj. (Landorphia, B. & H.); V. comerensis, Boj. (Landorphia, B. & H.); V. gummifera, Lam. (Landorphia, B. & H.); V. senegalensis, A. D. C. (Landorphia, B. & H.); Carpodinus R. Br., various species (Landorphia, B. & H.)—all natives of tropical Africa, yielding the various African rubbers; nearly all climbing plants of great size. Urceola elastica, Roxb. (charannesia, A. D. C.), Borneo; U. esculenta, Benth. (charannesia A. D. C.), Burmah; leuconotis eugenifolia, A. D. C.; alstonia costulata, Miq.; A. scholaris, R. Br.—Malay Archipelago; A. plumosa, Labill—Fiji Islands.

Lobeliaceæ.—Siphoncampylus caoutchouc, Don.; S. jamesonianus, D. C. —natives of Central America.

Asclepiadaceæ.—Periploca græca, L.—Island of Reunion; Cryptostegia grandibora, RO. Br.—Coasts of India; Cynanchum ovalifolium, Wight; Penang, Asclepias cornuti, Desc.—North America. Attempts were made to obtain caoutchouc from this source in Canada.

Compositæ.—Durango rubber obtained from some unknown composite plant was exhibited at the exhibition in Philadelphia, in 1876.

Much time of the meeting was occupied with a discussion of the Pharmacy Law. The sentiment of the members was in favor of a "re-registration" amendment to the law now in force. Through the report of the committee, the Association was informed of a number of bills that had been brought before the State Legislature to regulate the practice of pharmacy, among them the perennial one of dispensing poisons in a special bottle; this brought out a full discussion by members of the Association, and the

almost universal sentiment was opposed to the adoption of any mechanical device.

Ordo Rerum.—Rules to govern the employes of a pharmacy. Compiled by Thos. J. Keenan.

NORTH CAROLINA.

Proccedings of the 15th Annual Meeting of the North Carolina Pharmaceutical Association.—Held at Asheville, Sept., 1894.

The Materia Medica of Ceylon.—Henry Kraemer. (See Materia Medica).

Yellow Coloring Matter of Gentian.—E. V. Howell separated the coloring matter as follows:

1. A quantity of gentiana lutea was treated with 95 per cent. alcohol until exhausted. This was concentrated to one-half original bulk; glacial acetic acid was added. The impurities were then precipitated by alcoholic solution of lead acetate and filtered out. The filtrate was then treated with hydrogen sulphide until all traces of lead were removed by filtration. This filtrate was then evaporated to dryness to rid it of acetic acid. This dry extract was taken up with alcohol, precipitated with cold water and recrystallized from hot water.

2. A tincture was made from 95 per cent. alcohol, treated with gelatin and alum solution, the precipitate filtered out and the filtrate evaporated nearly to dryness, hot water added and allowed to cool. This water extract was then shaken with ether in a separating funnel. The ethereal extracts were drawn off and the residue shaken with ether. These ethereal extracts were evaporated to dryness, and shaken up with absolute alcohol, and allowed to crystallize. The yellow coloring matter in both cases was obtained in yellowish needles, arranged in star-shaped clusters. The alcoholic solution of these crystals was of neutral reaction. The crystals were odorless, insoluble in cold water, sparingly so in hot water, slightly so in ether, readily in alcoholic and alkaline solutions.

The author concludes that the coloring matter is either quercitrin, or one of its chemical decomposition products.

Prescription Difficulties and the Way Out of Them.—A. Bradley calls attention to the difficulties he has met and the ways of obviating the same.

A Plea for the Complete Adoption of the U. S. P.—By A. Bradley.

PENNSYLVANIA.

The Pennsylvania Pharmaceutical Association met at Reading, Pa. The following papers were presented: "Notes on Practical Pharmacy," by Joseph W. England:

"C-C" Cough Mixture.—Under this name a cough mixture is very largely used in the phthisical wards of the Philadelphia Hospital. It has,

in each fluid dram, the following: Codeine sulphate, one-eighth grain; dilute hydrocyanic acid, two minims; spirit of chloroform and mucilage of acacia, each fifteen minims; and syrup of wild cherry, a sufficient quantity to make one fluid dram. Dose, one fluid dram.

Distilled Extract of Witch Hazel.—The writer has been informed, on good authority, that the percentage of alcohol in the commercial distilled extract of witch hazel is not necessarily an index of its value, for the reason that some dealers buy the cheaper aqueous distillate from the distiller and add alcohol. The only proper product is had by distilling the fresh twigs with a mixture of alcohol and water, whereby a greater quantity of volatile oil is brought into solution than by distillation with water alone.

Syrup of Wild Cherry.—In making this syrup, more especially in the summer season, when fermentation takes place readily, it is advisable to add some of the sugar to the percolate as soon as possible, to prevent change. The pharmacopœial formula of 1870 contained no glycerin, that of 1880 ordered five per cent., and that of 1890 fifteen per cent. by volume. The last increase seems excessive. The greater the percentage of glycerin, the greater the amount of tannin extracted, up to a certain point. It is a question whether this increased astringency in the syrup is therapeutically desirable.

Ointment of Ammoniated Mercury.—This ointment is most difficult to make by the official process and secure entire freedom from "grit." The best method is, for example, to finely powder in a mortar 48 grains of the mercury compound and beat it into a smooth paste with 12 grains of glycerin, and make the official ointment from this, as wanted, by admixing one dram with 7 drams of cerate. In this connection, criticism may be made against the use of alcohol, as in the 1880 Revision, or olive oil, as in the 1890 Revision, to render veratrine smooth in making veratrine ointment. A small quantity of glycerin is better. Glycerin is also of superior utility in softening extract of belladonna prior to making it into ointment; the Pharmacopœia specifies diluted alcohol.

Mucilage of Sassafras Pith.—This mucilage is best made by beating the pith in a wedgewood or porcelain mortar with a small quantity of *sterilized* water until it gets pasty, expressing through cheese-cloth, returning residue to mortar, adding more of the water and continuing as before. In this way, in a short time, a dense and syrup-like mucilage may be had, very different in physical appearance from the watery product gotten by following the official directions of simple maceration in *water* for three hours and straining.

As this preparation is used as an emollient in inflammatory conditions of the eye-ball and mucous membrane, it is obvious that the greater the percentage of mucilage in solution the more soothing it will be. In these days of asepsis, the use of *water* in making the official mucilage is an un-

pardonable sin in the eyes of oculists. Sterilized water, *i. e.*, water or distilled water boiled and cooled, only should be employed. Three hours' time in making the preparation is far too long, when it can be better done in a few minutes.

Hope's Camphor Mixture.—This old preparation has been gradually increasing in use, and is recognized by the National Formulary under the name of Mistura Camphora Acida, which authority follows the formula of Ellis (Griffith's Formulary, 1866, p. 160) in using *nitric* acid. The original formula of Hope, however, specified *nitrous* acid. The formula we have used for years is: Fuming nitrous acid, 2 fluid drams; tincture of opium, 80 minims, and camphor water, 1 pint. Parrish's Pharmacy (1884) refers to the mixture as follows:

"This formula was originally made public after twenty-six years' experience of its use in dysentery, by Thomas Hope, Esq., surgeon, Chatham, in the Edinburgh Medical and Surgical Journal, January, 1824. Hope was in the habit of directing *nitrous* acid, *not* nitric, which he says he has 'not found to produce any good effect.' He has been careful to follow his formula literally, and has for the purpose prepared nitrous acid by the process given on p. 200; though nitrous acid passes into nitric acid by contact with water, this reaction does *not* occur in the presence of an excess of nitric acid. Few remedies have a more general and widespread reputation than this; it is now frequently prescribed, more than eighty years after its virtues were originally discovered."

The nitrous acid used is known in commerce as fuming nitrous acid or fuming nitric acid. It is really nitric acid holding in solution nitrous acid fumes, which latter may be wholly removed by boiling, or largely by simple and continued exposure to the air; so that the commercial product varies considerably in strength of absolute nitrous acid.

Remington's Pharmacy (1885) p. 1027, specifies nitrous acid in the formula for this mixture, as does also the National Dispensatory of 1884 (p. 75) and 1894 (p. 76). Hope's Camphor Mixture is still largely used in summer dysenteries, and if Mr. Hope's contention as to the necessity of using only *nitrous* acid, *never* nitric, is correct, then the National Formulary decidedly errs in following the formula of Ellis and specifying the latter.

The objection sometimes raised as to the difficulty of securing good fuming nitrous acid can be met. The pharmacist can easily make his own nitrous acid, extemporaneously, from sodium nitrite and nitric acid, using quantities sufficient to yield the amount of acid in the formula, which is small.

Medicated Waters.—In the making of medicated waters—save those prepared by distillation or direct solution—the new Pharmacopœia directs precipitated calcium phosphate as the distributing medium in about the same proportion as that directed for magnesium carbonate in the 1870 issue. As was pointed out by the writer ten years ago (A. J. P., 1884, p.

75) in advocating the use of precipitated calcium phosphate for this purpose, it is essential, in order to properly distribute the oil, that the lime compound be used in *double* the quantity of magnesium carbonate usually employed, on account of its much less bulk. The official quantity of the lime compound should be 8 Gm. to 1,000 C.c. of the medicated water, and not 4 Gm. as directed.

It is best to add, as the Pharmacopœia directs, *all* the water to the admixed lime compound and oil before filtration. The practice of some pharmacists adding only a *part* of the water, throwing on a filter and then adding further water, from time to time, to the contents of the filter until the required amount has filtered through, cannot result in as strong a solution as if the oil had been brought in intimate contact with all the water at once.

There is one detail whereby the official process can be greatly improved, and that is by using in place of the distilled water, *hot, boilea* water, *i. e.*, water boiled and cooled to a point just short of boiling. In following this practice, the writer adds the water to the admixed lime compound and oil, places it in a proper vessel, covers tightly, and filters after it has stood for some hours, preferably over night.

The use of hot, boiled water has a number of very decided advantages. These are a maximum solution of the oil and an increased permanency of the water. Boiled water is far more germ-proof than the usual distilled water of commerce, which is believed to be, in some cases at least, simply condensed steam-waste.

Criticism may be made against the use of nearly boiling water for making aromatic waters, on the ground of loss of volatile oil; but practical experience will show that this loss is more apparent than real, that the amount of volatile oil lost by volatilization is insignificant in comparison with the greatly increased amount brought into solution.—Through Amer. Jour. Pharm.

Pharmaceutical Notes.—C. B. Lowe:

Terebenum or *Terebene* has come into somewhat extensive use as a remedy for chronic bronchitis, and it is frequently an ingredient of cough mixtures, or is prescribed by itself.

On account of its slight solubility in water, and its somewhat unpleasant taste, it is best given in an emulsion.

The emulsion should be made by the addition of one dram of powdered gum arabic for each fluid dram of terebene.

The primary emulsion, consisting of gum and water, should first be carefully prepared, and then the terebene should be slowly and carefully added.

The emulsion will be found quite a difficult one to make, the terebene being easily thrown out of solution.

Mustard Plasters.—None of the manufacturers have included in their

directions that of wetting the plasters before using with only *tepid* water. The acrid or volatile oils of mustard do not pre-exist as such in the seed, but are produced by the splitting up of the glucosides sinalbin or sinigrin, by the action upon them in the presence of moisture of the ferment called myrosin.

It is a fact that should be better known that myrosin is coagulated by water of a temperature of 140° F., and rendered incapable of action.

Many people are under the impression that the plaster will be made the more active by dipping it into hot water, but the reverse is the case.

Syrup of Acacia.—It seems strange that the Pharmacopœia should have continued unchanged the formula for Syrup of Acacia.

In the Pharmacopœia of 1870 the syrup was made directly from the gum, and we had a fairly stable preparation.

In the last two Pharmacopœias it is ordered to be prepared from the mucilage, which spoils quickly, and the syrup thus made would ferment in a few hours, unless the mucilage was freshly prepared.

The formula of Mucilage of Acacia can be improved upon by the use of chloroform water of the strength given in the British Pharmacopœia.

If the chloroform is objectionable from a therapeutical standpoint, a few minutes' exposure to the heat will thoroughly dissipate it.

The most convenient way of dissolving the gum is by means of a dialyser.

Fluid Extract Triticum Repens.—The question is asked: "What is the cause of the active effervescence which takes place when fluid extract triticum repens is added to a carbonate?"

If active effervescence occurs, he thinks it is due to fermentation having taken place.

The fluid extract is made by first percolating with boiling water, afterwards evaporating and adding 25 per cent. of alcohol.

As the medicinal constituents consist of three sugars, two of them directly fermentible, if too much time be taken in percolating and evaporating, there is apt to be some fermentation before the alcohol is added.—Through Amer. Journal Pharm.

Other papers were, "The Beneficent Society of American Apothecaries of the State of Pennsylvania," by W. B. Thompson. "Do Drugs Supplied by the Jobbers Comply with Pharmacopœial Requisitions? If Not, Who is Responsible, the Jobber or the Retailer?" by Louis Emanuel. "Liquor Ferri Chloridi as Found in the Market," by A. L. Beck. "Unguentum Hydrargyri," by H. N. Coxe. "Can the Acidity of Guaiac be Modified?" by W. B. Thompson. Considerable discussion followed the reading of a paper entitled "The Cutters and the Remedy," by J. H. Redsecker. Mr. Redsecker proposed the enactment of a law by the legislature requiring the formulas of all proprietary medicines sold in the State to be deposited with the Board of Pharmacy accompanied by a certain fee. The proposed

law will not include the preparations of druggists, where the sales are $500 or less. C. E. Hires, of Philadelphia, addressed the Association on the subject, "Shall We Give Our Clerks and Employees a Percentage of Gross Receipts instead of a Regular Salary?"

VIRGINIA.

Proceedings of the 13th Annual Convention of the Virginia Pharmaceutical Association.—Held at Blue Ridge Springs, July, 1894. The following papers were read:

Menispermum Canadense.—C. B. Fleet. The root of this plant is used in domestic practice in Virginia under the name of Sarsaparilla.

Hydrogen the One Element from which the Other Elements are Formed.—G. Blair discusses this question.

Morphine and Opium Poisoning.—G. E. Barksdale finds permanganate of potassium an efficient antidote. In case of poisoning by the tincture he differs from Dr. Moor in finding that acetic acid is decomposed by the permanganate. Permanganate of potassium is not an antidote for either atropine or strychnine, but may prove of use in cocaine poisoning.

Cream of Tartar Adulteration.—G. E. Barksdale examined 10 samples obtained from grocery stores and pharmacies. That procured from the latter was pure, while ⅔ of the cream of tartar purchased in grocery stores was impure.

VERMONT.

Proceedings of the Vermont State Pharmaceutical Association.—At the special meeting at Montpelier, October, 1894. Contains the Proceedings, with Constitution and By-Laws and Vermont Pharmacy Law.

WISCONSIN.

Proceedings of the Fourteenth Annual Meeting of the Wisconsin Pharmaceutical Association.—Held at Racine, Aug., 1894.

Relations of Chemical and Drug Markets of Australia and U. S.—R. Upson comments chiefly on the vegetable materia medica.

Pharmaceutical Economic Minerals of New South Wales.—J. H. Maiden contributes an original letter.

Medical Value of Pepsin.—W. P. Clarke concludes that whatever good comes from the use of these preparations is due rather to their stimulating action on secretory glands of the stomach than to the actual digestive power of the medicine, and that their medicinal value, while not entirely wanting, is not at all commensurate with the claims made for them, nor with the cost to the consumer.

Examination of Tincture of Opium.—H. O. Hilfert examined 8 samples by the U. S. P. process and obtained the following results:

Number.	Gm. of Morphine in 100 C.c. of Tr.	Decrease from U. S. P. Standard, 1.3.
1	1.07	.23
2	1.07	.23
3	1.00	.30
4	.84	.46
5	.81	.49
6	1.06	.24
7	.90	.40
8	1.17	.13

The History of the Thermometer.—A careful compilation.

History of Scales and Weights.—A. C. Morrison records a short history.

Preservatives in Fruits, Vegetables, etc.—A. S. Hipke records analyses.

Chemistry and Pharmacy.—R. Sommers compares the relations between chemistry and pharmacy a hundred years ago and the existing relations between these sciences.

Pharmacy in Wisconsin.—J. A. Dadd considers the early history and development in Wisconsin.

New Remedies.

Remedies introduced in 1894.*

The following list has been published in the various journals:

Acetogen—Used in manufacturing vinegar.

Aceton (not "Acetone")—Grip and headache remedy.

Acetonoresorcin—Combination of two molecules of resorcin and one of acetone.—Antiseptic.

Acid, Glycerinophosphoric—$(HO)_2PO.O.C_3H_5.OH$.—Nervine.

Adonis Æestivalis, Tincture—Anti-fat remedy.

Algodyne—Proprietary tooth tincture.

Alphol—Salicylic ether of alpha-napthol.—Internal antiseptic, like salol.

Aluminum Boroformate—Disinfecting astringent.

Ammonol—"Derivative of the Amidobenzene series."—Stimulant, analgesic and antipyretic.

Amylocarbol—Mixture of nine parts of carbolic acid soap (150), amylic alcohol (160), and water (681).—Antiseptic.

Anadol—Proprietary antipyretic and analgesic.

Analgesin—Tablets containing acetanilid, ammonium chloride, caffeine and sodium bicarbonate.—Analgesic.—("Analgesine" is a French synonym of antipyrine.)

Analgia—Proprietary analgesic and antipyretic.

* See also Lists in Proceedings for 1893 and 1894.

Analgine-Laborde—Another proprietary analgesic.

Anundea—Proprietary analgesic.

Anodin—Proprietary ophthalmologic anæsthetic.

Antalgia—Proprietary antipyretic and analgesic.

Antibacillin—Proprietary disinfectant.

Anticlavus—Proprietary pain reliever.

Antidiphtheritikon—Bokaïs mixture of oil birch (5), oil beech (3), alcohol (90), potassium carbonate (1), and potassium sulphide (5).—Diphtheria remedy.

Antidol—Proprietary pain reliever.

Antidolor—Proprietary anodyne.

Antifetor—Proprietary deodorizing powder.

Antiyponin—Sodium tetraborate, soluble.

Antipyralgine—Proprietary anodyne.

Antipyralgos—"Coal tar derivative." Proprietary antipyretic and anodyne.

Antirheumatin—Mixture of sodium salicylate and methylene blue.—Antirheumatic.

Antitetraizin—"Quinine derivative."—Anodyne.

Antithermal—Proprietary febrifuge.

Antitoxine—Proprietary antipyretic and anodyne. (Not to be confounded with the generic term "Antitoxin," the blood serums of immunized animals).

Apodyna—Proprietary anodyne and antipyretic.

Arecoline Hydrobromate—Salt of alkaloids from Areca catechu.—Laxative in veterinary medicine.

Argentamine—Ethylenediamine-silver phosphate solution. A $\frac{1}{10}$ solution of silver phosphate in 10 per cent. ethylenediamine solution.—Antiseptic astringent.

Arophene—Proprietary dental anæsthetic.

Athanon—Proprietary disinfectant.

Atherin—Ammoniated pyrogallol solution.—Hair dye.

Bacillin—Proprietary deodorizer and disinfectant.

Backerine—Proprietary "yeast cure for phthisis."

Benzacetine—Acetamidomethylsalicylic acid.—Antineuralgic.

Bismuth and Sodium Iodide—$BiI_3.4NaI$.—Alterative.

Bismuth-Napthol Hydrate—Chapin's antiseptic.

Bismuth Sulphocarbolate—Antiseptic astringent.

Boral—Aluminum borotartrate—Disinfecting astringent.

Borsalicyl—The result of the action of boric acid (25) upon sodium salicylate (32).—Antiseptic.

Brassicon—Proprietary headache remedy.

Bromalin—Bromethylformin.—Antiepileptic.

Caffeine Oxalate—$C_8H_{10}N_4O_2.C_2H_4O_2$.

Calcium Glycerinophosphate—$CaC_3H_7PO_6$.—Nervine.

Calolactose—Mixture of calomel (1), bismuth subnitrate (1) and lactose)8).—Intestinal disinfectant.

Cannabindon—Narcotic principle obtained from cannabis indica.

Cannonin—Proprietary disinfectant.

Capitcura—Proprietary antipyretic and antineuralgic.

Carbolin—Coal tar disinfectant.

Chemia—Antiseptic.

Chlorakaline—Proprietary remedy like bromidia.

Chloroiodolipol—Chlorine, substitution product of phenol creosote and guaiacol.—Inhalation antiseptic.

Chroatol—Parasiticidal dermic.

Chromosot—Chiefly sodium sulphite and sulphate.—Disinfectant.

Cocaine lactate—$C_{17}H_{21}NO_4.C_3H_6O_3$.—Specially adapted in the local treatment of tuberculous cystitis with lactic acid.

Collasin—Schiff's skin varnish.

Coronillin—Glucoside from Coronilla scorpioides.—Cardiac.

Cryostase—Mixture of equal parts of carbolic acid, camphor, and saponin, with traces of turpentine oil.—Becomes solid when heated, and liquid when cooled to below o° C.

Crystalline Modified—Solution of pyroxylin (1) in a mixture of methylic alcohol (4) and amyl acetate.—Dermic.

Cutal—Aluminum borotannate.—Disinfecting astringent.

Cutal Soluble—Aluminum borotanno-tartrate.

Dermol—Bismuth chrysophanate.—Astringent dermic.

Dermolin—Proprietary ointment-base (soap).

Diaphthol—Quinaseptol; Orthoöxy-quinolinemetasulphonic acid.—Internal antiseptic.

Diatomit—Disinfectant.

Diiodoform—Tetraiodoethylene.—Antiseptic.

Diphthericide—Pastilles of thymol, sodium benzoate, and saccharin.—Prophylactic against diphtheria.

Emulsion—Paraffin oil oxidized under pressure.—Emulsifier.

Entomofobo—Insect killer.

Eurybin—Glucoside from eurybia moschata.

Fareol—Proprietary anodyne and antipretic.

Febrinol—"Coal tar product."—Anodyne and antirheumatic.

Ferratin—Compound of iron extracted from the liver of the hog. Contains 6 per cent. Fe.—Hæmatinic.

Fostite—Insect destroyer.

Gallal—Aluminum gallate.—Astringent.

Genetica—Proprietary remedy for gonorrhœa.

Glycogelatin—Ointment base.

Glycoline—A petroleum oil for use in atomizers.

Guaiacolin—Proprietary emulsion of cod liver oil.

Hœmalbumin—Dietetic preparation containing the salts and albumoses of blood.

Hæmoferrum—Preparation from blood.

Illodin—Proprietary cosmetic.

Ingestol—Proprietary stomachic mixture.

Iodocasein—Antiseptic.

Iodoformin—Derivative of formaldehyde.—Antiseptic.

Iodophenochloral—Mixture of equal parts iodine tincture, carbolic acid and chloral hydrate—Parasitical dermic.

Iodsuccinimide—Succedaneum for iodoform.

Jessanodine—Proprietary antiseptic and analgesic.

Kaputine—Said to be colored acetanilid.

Katharine—Tetrachlormethane ; carbon tetrachloride.

Kephaline—Proprietary headache remedy.

Klinol—Proprietary antipyretic and analgesic.

Kreplinum—Tincture Panama bark mixed with small quantities of aromatic oils.

Kressapol—Disinfectant.

Lactol—Lacto-naphthol ; lactic ether of beta napthol.—Intestinal antiseptic.

Lactophenin—Paralactophenetidin.—Substitute for phenacetin.

Liquor Anthracis Compositus—Liquor anthracis simplex admixed with sulphur, resorcin and salicylic acid.—Antiseptic protective.

Liquor Anthracis Simplex—A preparation of tar.—Protective.

Liquor Antisepticus, Volkmann—Solution of thymol (1) in mixture of alcohol (10), glycerin (200), and water (100).

Listol—"Compound of thymol and iodine."—Antiseptic.

Loretin—Metaiodo-ortho-oxy quinolineanasulphonic acid.—Antiseptic.

Lucilline—A pure petroleum jelly.

Luperine—Mixture of powdered gentian, columbo and quassia.—Remedy against dipsomania.

Lycetol—Dipropylenediamine.—Solvent of uric acid.

Lysidine—Ethylenethenyldiamine.—Uric acid solvent.

Malakin—Salicylaldehydparaphenetidine.

Mercury and Potassium Hyposulphite—$3Hg(S_2O_3)_2+5K_2S_2O_3$.—Specially adapted to subcutaneous injection.

Migrainin—Citrated antipyrine-caffeine. Antineuralgic.

Neurodin—Acetylparaoxyphenylurethane. Antineuralgic and nervine.

Nutrin—Dietetic food, representing, according to the manufacturer "the pure nutritious substance of meat."

Odontodol—Mixture of cocaine hydrochlorate (1), cherry laurel oil (1), tincture arnica (10), and solution ammonium acetate (20).—Dental anodyne.

Orchidin—Boehl's testicular fluid.—Nervine.

Oxyacanthine—Alkaloid from barberry bark.

Ozalin—Mixture of calcium, magnesium and iron sulphates, with caustic soda and magnesia.—Disinfectant.

Paicoline—Proprietary stomachic.

Paraform—Polymeric formic aldehyde.—Intestinal disinfectant.

Pelagin—Solution of antipyrine, caffeine and cocaine.—Seasickness remedy.

Phenatol—Mixture of acetanilid, sodium carbonate, bicarbonate and chloride and caffeine.—Antipyretic and anodyne.

Philopaidia—Proprietary diphtheria remedy.

Phœnixin—Carbon tetrachloride.—Succedaneum for benzin.

Phospherrin—Mixture of a solution of ferric chloride, phosphoric acid and glycerin.

Pomegranine—Alleged alkaloid from the rind of pomegranate fruit.—Local anæsthetic.

Pyretine—Propr. antipyretic and analgesic.

Resorbin—Ointment base consisting of almond oil, wax, soap and water.

Rhinosclerin—Extract prepared (like tuberculin) from pure cultures of the rhinoscleroma bacilli.—Remedy against rhinoscleroma.

Salactol—Sodium salicyl-lactate.—anti-diptheritic.

Sal Anæstheticum—Generic name for Schleich's mixtures of cocaine and morphine hydrochlorates, with or without codeine phosphate.

Salifebrin—Salicylanilide; antifebrin salicylate [?].—Antipyretic and anodyne.

Salubrin—Mixture of acetic acid anhydride (2 per cent.), acetic ether (25 per cent.), alcohol (50 per cent.) and water (23 per cent.).—Antiseptic and hæmostatic.

Salumin, Soluble—Aluminum and ammonium salicylate.—Disinfecting astringent.

Sapocresol—Disinfectant.

Scopolamine Hydrobromate—Salt of an alkaloid from Scopolia atropoides.—Mydriatic.

Solphinol—Mixture of borax, boric acid and alkaline sulphites.—Antiseptic.

Spasmotin—Sphacelotoxin, poisonous element of ergot.—Oxytocic, like ergot.

Symphorol—Formerly called "Nasrol." Generic name for the salts of caffeine-sulphonic acid. "L"—Lithium. "N"—Sodium. "S"—Strontium Salt.—Diuretics.

Tannigen—Acetyltannin.—Intestinal astringent.

Tannon—Remedy against foot-and-mouth disease.

Terralin—Name of special petroleum jelly.

Theolin—"Distillate from an American species of pine."—Substitute for benzene.

Thermodin—Acetylethoxyphenylurethane.—Antipyretic.

Thermotoxine—Proprietary analgesic and antipyretic.

Thiosapol—Generic name of a group of soaps chemically combined with sulphur.

Thymenthol—Proprietary antiseptic.

Thymozone—Proprietary antiseptic.

Traumatol—Iodocresol.—Substitute for iodoform.

Tricresol.—Purified natural mixture of the three cresols of coal tar.—Antiseptic.

Tricresolamine.—Ethylenediamine.—Tricresol solution. Mixture of equal parts ethylenediamine and tricresol.—Antiseptic.

Triformol—Paraformaldehyde.—Antiseptic.

Tussol—Antipyrine amygdalate.—Whooping cough remedy.

Vaselon—Solution of stearon and margaron in neutral mineral oil.—Ointment base.

Vasogen—Oxygenated vaselin. Sulpholeated mineral oil miscible with water.—Absorbent vehicle.

Vasogenius—Concentrated solutions in vasogen.

Vasogens—Weak solutions in vasogen.

Separation of Synthetic Remedies—Lenzinger has examined the behavior of several new synthetic remedies when treated according to Dragendorff's shaking-out method. From an acid solution he found petroleum spirit removed guaiacolbenzol, guaiacol salicylate, benzonaphthol, alphol, agathin, salacetol, methylsalol, orthocresalol, paracresalol, metacresalol, benzocresalol, malakin and thermodin, but traces only of guaiacol cinnamate and naphthol carbonate. Benzol removed salophen, pyrodin, guaiacol cinnamate, lactophenin, β naphtholcarbonate, gallanol, symphorol Na, Li and Sr; after previous boiling with hydrochloric acid—neurodin, malakin, thermodin, and traces of analgen. Chloroform dissolved pyrodin and analgen. From ammoniacal solution petroleum spirit removed phenocoll, benzol, tolypyrine; chloroform, analgen; amylic alcohol, gallanol.—Pharm. Post, xxviii, 180.

Identity Tests of a Few New Remedies.—A resolution was passed at a meeting of the Austrian Pharmaceutical Society, asking of the manufacturing chemists to publish the identity tests for all new products which are intended to find therapeutical application. The different manufacturers willingly did so, and as the result G. and R. Fritz publish for the Society the following tests (Pharm. Post, xxviii, pp. 89 *et seq.*):

(1) *Agathin* (Salicylic Aldehyde-Methylphenylhydrazine): White (tinged light-greenish), lustrous, odorless, tasteless scales; insoluble in water, very soluble in ether or hot alcohol, slightly so in cold alcohol or ligroin; melts at 74 degrees C. (165.2 degrees F.), is not discolored even on prolonged exposure to light; heated upon platinum foil it burns without leaving a residue.

(2) *Airol* (Bismuth Oxyiodogallate) : The properties and identity tests of this new drug are given under Airol. (See page 666.)

(3) *Alumnol* (Aluminum Naphtoldisulphonate) : Fine, light-reddish, non-hygroscopic powder, readily soluble in cold water ; acts as a reducing agent ; precipitates silver, producing a black coloration, from a solution of silver nitrate ; ferric chloride produces with it a deep-blue coloration, even in every dilute solution ; its solutions have an acid reaction, and precipitate albumen and gelatin from their solutions, which precipitates, however, are re-dissolved on addition of excess of albumen or gelatin.

(4) *Ammonium Sulphoichthyolate* (Ichthyol) : Brownish-red, syrupy liquid, of a characteristic empyreumatic odor and taste ; charred by heat, and if strong heat is continued it volatilizes without residue ; water dissolves it, forming a clear, reddish-brown solution, showing a weak acid reaction, as does also its solution in a mixture of equal volumes of ether and alcohol ; pure alcohol or pure ether dissolves ichthyol but partially ; hydrochloric acid added to its aqueous solution separates from it a resinous body, which is soluble in ether, as also in water, but from its watery solution it is again precipitated by hydrochloric acid or sodium chloride ; on the addition of potassium hydroxide to ammonium sulphoichthyolate, the odor of ammonia is evolved ; this mixture, when dried and ignited, produces a sulphide of carbon, which yields hydrogen sulphide on the addition of hydrochloric acid.

(5) *Argentamine* (Solution of Silver Nitrate and Ethylenediamine) : Colorless, strongly alkaline liquid, miscible with water in all proportions ; hydrochloric acid produces a precipitate of silver chloride ; this solution, freed from silver chloride by filtration, emits, on heating with chloroform and potassa a strong odor of carbylamine ; the same solution, freed from silver chloride, leaves, on evaporation, a crystalline mass composed of hydrochlorate and nitrate of ethylenediamine.

(6) *Aristol* (Dithymol Diiodide) : A brick-red powder having a resinous feel ; heated carefully it melts to a brown mass, emitting vapors of iodine ; ignited on the platinum foil, it burns up completely with a sooty flame ; carefully heated with lime, it produces a sublimate of dithymol, recognizable by its characteristic odor.

(7) *Chloral-Caffeine :* Crystalline mass made up of thick leaflets, readily soluble in water ; on boiling its solution a separation takes place of chloral-hydrate and caffeine, the latter, on cooling, crystallizing in the well-known fine long needles.

(8) *Dermatol* (Bismuth Subgallate) : Fine, yellow, odorless, tasteless, insoluble powder ; concentrated hydrochloric acid converts it into bismuth chloride ; concentrated sulphuric acid has but little effect upon it in the cold, but dissolves it on warming ; it is quickly soluble in ammonia water ; hydrogen sulphide decomposes it with the production of bismuth sulphide.

(9) *Europhen* (Isobutylorthocresol iodide] : Yellow powder of a

saffron-like odor and a resinous feel; carefully heated it melts at a little below 50° C. to a yellowish mass, which easily gives off iodine; triturated with water and filtered, the filtrate, on the addition of fuming nitric acid, produces a blue coloration with starch paste; heated with lime it emits the characteristic odor of isobutylcresol.

(10) *Lactophenin:* Bitterish crystals melting between 117.5° and 118° C.; 0.1 Gm. boiled for one minute with 1 C.c. of hydrochloric acid, then diluted with 10 C.c. of water, cooled and filtered, produces a ruby-red coloration on the addition of 3 C.c. of solution of chromic acid; 0.1 Gm. dissolved in 10 C.c. of hot water, cooled and filtered, yields a filtrate which is rendered very turbid when bromine water is added, until the solution acquires a yellow color: this turbidity, however, disappears when a large quantity of water is added.

(11) *Levulose* (Diabetin): White, or light-yellowish, friable mass, possessing a sweet taste; its aqueous solution, first solution of calcium chloride, then with ammonia until alkaline, and finally with acetic acid until of an acid reaction, the liquid remains clear; its aqueous solution (1 : 10) introduced into a 200 mm. tube of a polarizer, turns the plane of polarization at least 16 degrees to the left.

(12) *Loretin* (Orthooxyquinolinemetaiodoalphasulphonic acid): Yellow, odorless powder, slightly soluble in water or alcohol at ordinary temperature; insoluble in ether, benzol, or chloroform; at 250° C., it assumes a brown color, and at 260 to 270° C., it begins to decompose with the emission of iodine vapors; ferric chloride produces an intense green coloration.

(13) *Losophan* (Triiodemetacresol): White, crystalline powder, which is insoluble in water, difficultly soluble in alcohol, readily soluble in ether, benzol, and chloroform, or fatty oils; melting-point, 121.5° C.; heated it gives off vapors of iodine: concentrated solution of sodium hydroxide changes it to a greenish-black, amorphous substance, which is no longer soluble in alcohol.

(14) *Lycetol* (Dimethylpiperazine tartrate): White, odorless powder, easily soluble in water; melting point, 243° C.; solution has an acid reaction, and a lemonade-like taste; heated with burnt lime it yields a distillate which contains free dimethylpiperazine, the latter possessing, in a high degree, the power of dissolving uric acid.

(15) *Lysidin* (Ethylenethenyldiamine; Methylglyoxalidin): White, very hygroscopic crystalline mass, of a peculiar odor; readily soluble in water or alcohol, almost insoluble in ether; melting-point, 99° to 100° C.; the aqueous solution is strongly alkaline; ferric chloride produces a brown precipitate, and zinc chloride a white one; mercuric chloride precipitates a double-salt, melting at 162° C.; on heating the solution with silver nitrate, a precipitate of metallic silver is formed.

(16) *Malakin* (Salicylaldehyd-Paraphenetidine): Yellow, odorless, tasteless needles, melting at 92° C.; very little soluble in water, but soluble

in hot alcohol or ether; on prolonged boiling with water, or on the addition of acids, or acid salts, the characteristic odor of salicyl aldehyde is evolved; if 0.5 Gm. of finely pulverized malakin is mixed with 20 or 25 C.c. of boiling water, shaken, cooled and filtered, the filtrate gradually yields, on the addition of 1 and 2 drops of ferric-chloride solution, a dirty-violet color (salicyl aldehyde), or a cherry-red color (phenetidine).

(17) *Migrainin* (Antipyrine, Caffeine Citrate): White powder, readily soluble in water; gives the reactions of both antipyrine and caffeine; distinguished from antipyrine by the fact that its aqueous solution, on the addition of solution of sodium nitrite, acquires a greenish coloration without the need of the addition of an acid.

(18) *Phenocoll Hydrochlorate* (Amidoacetparaphenetidine Hydrochlorate): White, light powder, consisting of minute needles of a sweetish taste; 0.5 Gm. forms a clear solution with 15 C.c. of water; soda solution precipitates the phenocoll base, as a white crystalline mass; its solution, boiled for a few minutes with a few drops of hydrochloric acid, gives all the reactions, though more faintly, which phenacetine exhibits faintly under similar conditions.

(19) *Piperazine* (Diethylene-diamine): Crystalline masses consisting of shiny glassy tablets, freely soluble in water; aqueous solution dissolves a large quantity of uric acid; platinum chloride produces a characteristic double salt, occurring in square leaflets; Nessler's reagent, as also mercuric nitrate, produces a white precipitate; cupric sulphate produces a voluminous blue precipitate; silver nitrate is not precipitated; bromine water is energetically decolorized by piperazine; potassium permanganate is reduced by piperazine.

(20) *Salocoll* (Phenocoll Salicylate): White flocculent powder, consisting of velvety needles having a sweetish taste; its aqueous solution produces a violet color with ferric chloride, the color being discharged on the addition of hydrochloric acid; on heating with a solution of sodium hydroxide, allowing to cool, and adding a trace of chloral hydrate, the odor of carbylamine is evolved; if it be dissolved in diluted hydrochloric acid, and, after the liberated salicylic acid has crystallized out on cooling, the solution be filtered, the filtrate yields a reddish-brown precipitate on the addition of a solution of iodine.

(21) *Salophen* (Acetylparaamidosalol): Small, thin, yellowish-white, odorless, tasteless leaflets; on boiling 0.1 Gm. with 10 C.c. of 2 per cent. solution, the latter acquires, immediately, a blue coloration, which disappears from further heating, the solution subsequently assuming a yellowish-red color; if this solution be exposed to the action of the air, a sky-blue coloration will be produced in its upper layers, the color being gradually communicated to the rest of the liquid.

(22) *Symphorol*, N. L., and S., (Sodium, Lithium, and Strontium Caffeinesulphonates): White, odorless, bitter powders. Symphorol L., and

S., are readily soluble in water, while symphorol N. is difficultly so; they are all insoluble in ether, benzol, or chloroform: their solutions, upon the addition of barium chloride or silver nitrate, become slightly turbid, but no precipitate is produced.

Reactions of the Alkaloids and of Acetanilid.—Tafel has pointed out that anilids, such as acetanilid, give a reaction with sulphuric acid and an oxidizing agent which resembles the strychnine reaction. Flückiger has drawn attention to a similarity between the reaction of morphine with sulphuric acid, containing nitric acid, and that of acetanilid with the same reagent. Schär has tested both of these statements; he finds, with respect to the strychnine reaction, that this differs in two main points from that yielded by acetanilid. (1) The play of color shown by strychnine is from blue to methyl violet, whereas that exhibited by acetanilid is rather a blue-purple-red coloration. (2) The introduction of the oxidizing agent into the solution of strychnine in sulphuric acid induces a deep violet color, which gradually changes—through cherry-red, purple-red and blood-red—to yellow-red, while in the case of acetanilid, there is a rapid change from purple-red, through violet-red, into a dirty blue-green, olive-green, or brown-green.

The reaction of sulphuric acid, containing nitric acid, on morphine and and on acetanilid, is certainly very similar; but acetanilid gives no reaction with sulphuric acid, which contains selenic acid, titanic acid, molybdic acid, or tungstic acid, and thus should not be taken for morphine. Furthermore, morphine gives a deep red-brown color with sulphuric acid and bismuth subnitrate, while acetanilid gives a dark yellow color, becoming carmine-red at the edges of the mass.—Archiv. der Pharm., 1894, 249.

Acetanilid, or Antifebrin, sometimes causes alarming symptoms, especially in doses above 8 gr. Treatment.—Induce vomiting, keep the patient warm in bed, give a teaspoonful of sal volatile (but no alcohol), and, if there are indications of collapse, subcutaneous injections of ether and caffeine. Four hours after the dose has been taken brandy may be given, in teaspoonful doses well diluted with water.—Amer. Drug. etc., 1894.

Mercury Acetanilid.—L. Pesci has obtained the following compound by the action of mercury acetate upon a boiling solution of acetanilid of the formula $\left\{ Hg\begin{matrix} C_6H_4—NH—C_2H_3O \\ \diagdown\!\diagup \\ C_6H_4—NH—C_2H_3O \end{matrix} >Hg \right\} (C_2H_3O)_2$. It forms shining rhombohedral crsytals, M. P. 218–220° C., soluble in boiling water or methyl alcohol but not in benzol. On treatment with KOH, a hydroxide is obtained which, on treatment with BaS, yields para-mercuriacetanilid. This is not crystallized, from boiling alcohol, and has M. P. 244–246°.—Gazz. Chim. Ital., 1894, 449; Chem. Zeit., 1895 (Rep.), 25.

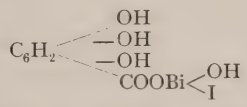
Diacetanilid, $C_6H_5N(C_2H_3O)_2$.—The old method of preparation of this

salt is by heating together phenyl mustard oil and acetic acid. It is now prepared by heating acetanilid with glacial acetic acid at 200° to 250° C. The reaction product is taken up by hot petroleum ether and crystallized, while the unaltered acetanilid remains behind undissolved. The physiological action of this compound is similar but stronger than acetanilid.—Pharm. Centralh., 1895, 92.

Acetanilid as an Antiseptic.—Thomas S. K. Morton (Phila. Polycl., 1895, 61) is the author of a lengthy paper on this subject, embodying observations upon the use of acetanilid in 1000 surgical cases. From his paper we make the following deductions: The action of acetanilid upon wounds, especially granulations, when used in full strength, is to produce intense dryness and blueness, and at once to check and prevent the formation of pus. If a very large surface is exposed to the action of the undiluted drug, toxic symptoms may manifest themselves in susceptible individuals. Under no circumstances does acetanilid irritate the skin or wounds. All ordinary suppuration ceases in the presence of acetanilid, even when much diluted. Abscess cavities, boils, and carbuncles, when opened, and dirty, greasy wounds produced by machinery, heal, as a rule without further suppuration, and in an unusually short time, under the use of acetanilid applied either in substance or as gauze, or ointment (1 in 8), or dissolved in alcohol, water, or oil (as injection). Tuberculous lesions appear to be affected in a much better manner by acetanilid than by iodoform. Tuberculous bone cavities have healed rapidly under 10-percent. acetanilid gauze. Fistulas have instantly taken on a healthy appearance after injection of alcoholic, watery, or oleaginous solutions of acetanilid, and have quickly closed. Upon chancroids the effect of this drug is, perhaps, most surprising of all. The patient is first directed to wash several times daily, and to rub in the dry powder. The powder usually forms a crust, which prevents excoriations by urethral discharges and otherwise helps the healing process. It thus appears that pus microbes cannot exist in the presence of acetanilid; and that skin bacteria cannot multiply in its proximity. This drug seems to have great possibilities of usefulness in first aid to the injured in factories, in ambulance service, etc.

Airol, an Antiseptic.—Airol is the outcome of a series of attempts to obtain a compound which shall combine the siccative properties of bismuth subgallate with the antiseptic properties of iodine. It owes its existence to F. Ludy, who describes it (Pharm. Centralh., xvi. 45) as bismuth oxyiodogallate—oxyiodide of bismuth subgallate, as it were. It is a grayish green, voluminous, odorless, tasteless powder, permanent to light. On exposure to damp air it gradually changes to a red powder, consisting of a more basic bismuth oxyiodide, containing less iodine than airol. It slightly reddens moistened litmus paper. In the ordinary solvents airol is insoluble, but it dissolves in alkalies and in diluted mineral acids. It gradu-

ally decomposes in the prolonged presence of much water, and more rapidly on being shaken with hot water. With a little water and glycerin airol forms an emulsion which retains its color for a long while. With vaselin and anhydrous lard it is said to yield stable ointments, and when mixed with cacao butter it retains its original color. The formula ascribed to the new compound is:



—that is to say, it is basic gallate of bismuth, in which one of the hydroxyl groups has been replaced by a molecule of iodine. As regards identity tests when airol is heated with concentrated sulphuric or nitric acid, iodine vapors will be evolved. When dissolved in very dilute hydrochloric acid, and shaken with chloroform or chlorine water, the chloroform turns violet in color, and another portion of the acid solution gives with ferric chloride an intense dark-green reaction (gallic acid); and when sulphuretted hydrogen is conducted into a solution of airol in diluted hydrochloric acid, black sulphide of bismuth precipitates. The red compound into which airol is converted by water gives the same identity reactions as airol, but the proportion of iodine is smaller. Clinically, airol was employed first by R. and W. Howald, who used it with good results as a dusting powder in surgical wounds and in crural ulcers, and since their reports a number of other physicans have employed it in burns, recent wounds, chancres, etc., with alleged success.—Apoth. Zeit., 1895, 63. (See also Schweiz. Wochenschr. f. Chem. u. Pharm., 1885, 21.)

Aluminum Boroformicum.—J. Martenson describes this as crystallizing in large well-defined crystals with a mother of pearl lustre, and its preparation is as follows: Introduce freshly-precipitated and well-washed alumina into a mixture of 2 parts of formic acid, 1 of boric acid, and about 6–7 of water, to the point of complete saturation. The solution, after clearing, is either used in this form, after establishing the percentage of aluminum boroformate in it; or it is allowed to crystallize. The salt dissolves slowly in water, but entirely also in dilute alcohol; its reaction is acid, its taste sweetish, and faintly astringent. Alumina is not precipitated by ammonia, sodium or potassium carbonates, or caustic alkalies. On evaporating the alkaline solutions, direct combinations with the alkalies are obtained which readily dissolve in water; the author has, however, not yet succeeded in crystallizing them. The solution of aluminum boroformate, directly prepared as above, differs in its behavior from the solution prepared from the crystalline salt; on adding alkaline carbonates, a copious sediment forms, and then the solution coagulates, commencing, according to the dilution, at about 50° C.; the turbidity disappears on cooling.—Pharm. Runds., 1894, 256.

Aminol.—This is a new antiseptic and deodorizer in the form of a gas, introduced within the past year. It is presented for use in the form of solution of the gas, which latter is obtained by the action of lime upon some of the *amine* compounds. It is said to occur in the flowers of the hawthorn and pear tree, but is also found in the natural decomposition of nitrogenous vegetable and animal matter. It is found in commercial quantities in the brine in which herring have been cured. An English firm call attention to the fact that it is being used successfully in combination with lime as the basis of the process for the purification of sewage at Wimbledon, England. Two solutions are offered, both alkaline, and of a disagreeable, shrimp-like odor. One is recommended for general disinfection and the other for gargles, injections and surgical dressings. The difference between the two solutions is not explained, but may be that of strength only.—Squibb's Ephem., 1895 (Jan.), 1591.

Ammonium Embelate.—Coronedi, the introducer of ammonium embelate as an anthelmintic, now states that it has also strong antiseptic action on pathogenic microbes (such as the bacillus anthracis), while enzymes (as ptyalin and pepsin) are not influenced by it. These properties and the absolute innocuousness of the remedy on man, may render it serviceable as a means of disinfection for the intestines and uro-genital organs, and externally in dermatosis.—E. Merck's Report, 1894, 35.

Ammonium Persulphate, $(NH_4)_2S_2O_8$, occurs in small, colorless crystals, turbidly soluble in water; its aqueous solution evolves active oxygen when heated. According to Wacker in 0.5 to 2 per cent. solution it is an effective disinfectant against comma bacilli, erysipelas streptococci, Staphylococcus aureus, and Bacillus pyocyaneus. This property makes it practically available for preserving and deodorizing victuals, particularly as the salt is well-nigh perfectly innocuous to the human organism; also as a succedaneum for potassium permanganate (f. i. in mouth-washes.)—Centralbl. f. Bakt., 1894, 503; Merck's Repart, 1894, 35.

Amyl Valerianate. — According to Blane (Rév. de Thérap. Méd. Chirurg., 1893) 1 part of cholesterin is dissolved by 3 parts of amyl valerianate. In general the preparation acts like ether. Dose 6 to 9 minims in capsules.—Ibid., 1894, 35.

Amylo Carbol is a name given to a mixture of 9 parts of carbolic acid, 150 of soap, 160 of amylic alcohol, with water to 1,000.—Brit. and Col. Drug., 1894.

Antipyonin.—Rolland describes it as sodium tetraborate, obtained by dissolving equal parts of borax and boric acid in boiling water and allowing the new salt to crystallize out. It is a readily soluble white unctuous powder without causticity or toxic effects. Rolland has employed it for the past three years to the exclusion of all other antiseptics in treating cases of keratitis and conjunctivitis, and he declares that there is no medi-

cinal substance that compares with it in respect to the number, ease and rapidity of the cures produced, as it appears to prevent the development of the pyrogenic elements either on the surface of the eye or in its cavity. —Sem. med., 1894, 234. See Squibb's Ephem., 1895, 1592, and Merck's Report, 1894, 37.

Analgen.—Goliner states that the smallest dose for adults is 0.5 Gm. and the maximum dose, 1 Gm. The daily dose should not exceed 3 Gm.—Aerztl. Prakt., 1894, 362.

Aniline Sulphate, $C_6H_7N.H_2SO_4$, is an amorphous, white powder, soluble in alcohol, less so in water. According to Fay (E. Merck's Bericht ueber das Jahr 1894, p. 38) it is an excellent internal cancer remedy, and eminently analgesic and deodorant. Of course, its application requires great caution, and the dose must be increased by degrees, according to the patient's impressionability. Commence with 0.1 Gm. as the daily dose, and gradually increase it to 0.8 Gm. pro die. The absorption of the remedy usually requires two hours. After this time lips and nails assume, with large doses, a bluish tint, and even dyspnœa and vertigo may supervene; but all these symptoms disappear within three hours, without any ill after-effects. The following are the usual prescriptions:

1.—Aniline Sulphate ..... 0.05 Gm.

Dispense 10 such doses in wafers; one morning and evening.

2.—Aniline Sulphate ..... 2 Gm.
Diluted Alcohol ..... 100 "
Saccharin ..... 0.2 "

Teaspoonful daily, gradually increasing to three tablespoonfuls.

Antipyrine Estimation.—M. F. Schaak prepares a standard solution containing 0.2 Gm. antipyrine in 25 C.c. of water, and adds 1.6 C.c. of one per cent. sulphuric acid and .8 C.c. of one per cent. solution of sodium nitrite, and then dilutes to 100 C.c. This solution will not change color in from 12 to 24 hours. This is compared with the unknown sample in acidified solution, to which is added the nitrite solution. The solutions assume a blue-green color due to the formation of nitroso-antipyrine. To avoid precipitation the solution must not be more concentrated than 1 in 500. By reason of the above the author suggests that the incompatibility of antipyrine and (acid) sweet spirit of nitre may be prevented by making the spirit neutral with potassium bicarbonate.—Amer. Jour. Pharm., 1894, 321.

Antipyrine.—Symptoms of poisoning such as are mentioned under acetanilid have been met mith. Give the patient teaspoonful doses of equal parts of sal volatile and spirit of ether.—Amer. Drug., etc., 1894.

Dose of Antipyrine.—The dose should not exceed 10 grs., according to

the Therapeutical Com. of the British Med. Assoc.—Brit. Med. Jour., 1894, 85.

Antipyrine and Salol in Uterine Hemorrhage.—Labadie-Laggrave obtained very satisfactory results from the exhibition of antipyrine as a hæmostatic in certain uterine hemorrhages, but found it awkward of application. Bralant (Bull. Gen. de Therap.) has obviated this difficulty by combining salol with the antipyrine. He heats equal parts of the two substances in a test tube until a light brownish colored liquid is formed. With this he saturates a tampon of absorbent cotton, which he introduces gently into the uterus. This he replaces once or twice as the severity of the hemorrhage seems to indicate. He packs the vagina lightly with absorbent cotton drenched with glycerin and creosote.—Amer. Drug., etc., 1895, 206.

Antitetraizin.—This is a quinine derivative recommended by Zambeletti (Milan) in the treatment of rheumatic and neuralgic pains, influenza, etc. The dose is 0.2–0.25 Gm.—Alumni Jour., 1894.

Aromatin.—According to Schweissinger, this powder, which is said to be the aromatic extractive of the hop, is coarsely powdered gentian root.—Apoth. Zeit., 1894, 519.

Benzacetine, or acetamido-methyl-salicylic acid, is a white crystalline body, melting at 205° C. It is soluble in alcohol, slightly so in water. It forms very active salts with bases. It is said to be an excellent remedy for neuralgia, and to give great relief in half an hour. A number of clinical experiments on it are being recorded.—Pharm. Centralh., 1895, 61.

Determination of Benzonaphthol.—Under the name benzonaphthol a number of mixtures of naphthol and benzoic acid have come into trade. The suggestion of Adrian, of differentiating such a mixture by the peculiar odor of free benzoic acid, according to Griggi, is not sufficient, since chemically pure benzoic acid is odorless. According to Griggi (Bolletino di chemica e farmacia) the fact that free benzoic acid is readily soluble in alcohol, while benzonaphthol is but sparsely so, is a much better test. If the substance is treated with iodide and iodate of potassium the presence of free benzoic acid will be shown by the formation of potassium benzoate, and the freeing of iodine, recognizable by the yellow color of the liquid, and by the development of the red-violet color on agitation of the latter with carbon disulphide. The presence of potassium benzoate in the liquid freed from iodine may be shown by the addition of iron chloride, which throws down a flesh-colored precipitate. Benzonaphthol does not behave in a similar manner.—Pharm. Centralh., 1894, 518.

Beta-Naphthol.—Baatz (Sem. Med., 1894, No. 59), points out a possible danger attending the use of beta-naphthol as an ointment. Two children, aged eight and six years, were treated for scabies with a salve containing two per cent. of this drug. Three weeks later, when the skin affection

was cured, albuminuria and œdema of both legs appeared, and one child died. Neither of the children had suffered from symptoms of renal disease before. A post-mortem examination was obtained, and the diagnosis confirmed.

Betaphenetidylcrotonic Acid Ethyl Ester.—This chemical is said to be obtained by mixing molecular proportions of parathenetidine and acetoacetic ether. This mixture becomes turbid and warm, while water is liberated. The new substance occurs as white, lustrous needles, melting at about 53° C., insoluble in water, but soluble in alcohol and in wood spirit. It is reported to be destined for therapeutic use; but thus far clinical data are wanting.—Pharm. Centralh., 1894, 687.

Bismuth Loretin.—The antiseptic action of loretin depends upon the gradual separation of iodine, which in the nascent state has considerable antiseptic action. Loretin forms salts with metals, and in these new bodies this property of the separation of nascent hydrogen is in some cases retained. This holds good with bismuth loretin, which possesses also the astringent properties of bismuth. The salt, even in large doses, does not produce symptoms of poisoning in animals, but after its internal administration iodine appears in the urine. As an application to chronic ulcers and specific lesions of the skin it was found extremely useful. Healing took place rapidly, and frequent dressings were found unnecessary.—Pharm. Centralh., 1895, 186.

Bismuth Naphtho-Glyceride.—This is the name under which a preparation has been recommended by Szymansky as a specific against gonorrhea. No information as to its composition or properties is given.—Ibid.. 63.

Bismuth Nitrosalicylates.—H. Causse shows that, even in dilute solutions, nitric acid in combination with bismuth oxide converts salicylic acid into β-nitrosalicylic acid, which is capable of forming a series of salts the appearance of which varies with their composition. Thus, the neutral β-nitrosalicylate of bismuth—$(C_6H_3.NO_2.OH\ CO_2)_3Bi + 2H_2O$—forms colorless needles; the basic salt—$C_6H_3.NO_2.O.CO_2BiOH + H_2O$—occurs as citron yellow needles; and the sub-β-nitrosalicylate of bismuth—$(C_6H_3.NO_2.OH\ CO_2)_2Bi_2O_2H_2 + H_2O$—precipitates in needles of a reddish-orange color. This property of the acid seems to be owing to the presence of the group NO_2 in its molecule. The red coloration of bismuth salicylate, supposed to be due to the presence of iron, is alleged to be caused by the presence of a nitrosalicylate. These statements should be of interest to dispensers.—Comp. rend., cxix., 690.

Bismuth Oxysalicylate.—D. B. Dott (Pharm. Jour. Trans., 1895, 582). This salt is usually simply described as bismuth salicylate, and there is probably no objection to the practice, as the normal salt (if it exists) is immediately decomposed by water into the basic salt and free acid, so

that there is little likelihood of it obtaining a place in medicine. The formula of the basic salt is $BiC_7H_5O_3(OH)_2$, or $BiO.C_7H_5O_3.H_2O$. This salicylate has within recent years come considerably into demand for the treatment of gastric catarrh and some intestinal disorders. Like most of the basic salts of bismuth, it is not perfectly white, but possesses a perceptibly grayish hue. It should yield mere traces to ether. This is a most important test. When dissolved in two or three parts of boiling hydrochloric acid it should yield plenty of crystals on cooling. On complete ignition there should remain 61.31 per cent. of oxide, or very near it. If any of the oxide becomes reduced to metal by the ignition, it must of course be oxidized by nitric acid or otherwise. The salt must be free from chloride and nitrate, which it is very liable to contain when prepared by the method of double decomposition usually recommended. The author tried the most approved processes of this kind, but with quite unsatisfacfactory results. Addition of glycerin, of sodium chloride, and of ammonium chloride, has been recommended to prevent precipitation of basic salt of the stronger acid. Causse has given (Compt. rend., cxiii., 547; Yearbook of Pharmacy, 1892, 29), detailed instructions for the preparation of the salicylate, using a large proportion of sodium chloride to prevent formation of oxychloride of bismuth. If the figures as given in the "Year Book" are correct, the amount of hydrochloric acid is insufficient to dissolve the oxide (40 C.c. acid to 35 Gm. oxide of bismuth). The author followed the process exactly, and also tried some obvious modifications of the same, with the result that oxychloride was invariably present in very considerable quantity, salicylate being correspondingly deficient.

In one experiment a large amount of uncombined salicylic acid was found in the product. In the experiment, which was conducted exactly as described in the abstract so far as that could be understood, the resulting compound contained 0.2 per cent free salicylic acid, and left 94.5 per cent. on ignition, an amount which is far in excess of the proper quantity. These experiments tend to explain the defects of some of the preparations found in the market, and show the necessity for testing this salt, which will probably take a permanent place in the "materia medica." The tests above described will be found sufficient to practically indicate the purity of the preparation.

Bismuth Pyrogallate is an amorphous, odorless and tasteless yellowish-green powder, insoluble in water and in alcohol, very slightly soluble in 0.3 per cent. solution of hydrochloric acid, from which it follows that it is but slightly decomposed by the liquors of the stomach. On the other hand it is readily soluble in less dilute acids, sulphuric acid being excepted. These decompose the salt into pyrogallol and the bismuth salt of the acid used. The solution in concentrated nitric acid is precipitated by the addition of an excess of potassium carbonate, which is not the case with a solution in hydrochloric acid. The following process is recommended by

V. Veltorio (Bollitino Chim. Farm.) for its preparation: Mix 2 parts of bismuth carbonate and 1 part of pyrogallol in a porcelain capsule, stir in so much water that a thin paste is formed, and warm until the evolution of carbon dioxide ceases. The mass swells up under this treatment and gradually changes from white to a lemon-yellow color. Then place the mass on a filter and wash until the filtrate ceases to give a violet color with lime water, and finally dry at 50° C. So made the preparation contains 60.1 per cent. of metallic bismuth. The author states that bismuth pyrogallate is non-toxic, that it is decomposed in small quantities only in the organism, bismuth but no pyrogallol appearing in the urine, and that it promises to be of much value in infectious intestinal diseases.—Apoth. Zeit., 1894, 687; Jour. Pharm. Chim., 1894, 438.

Bismuth Salicylates.—F. Thabius (Monit. Scient., 1895, 4 Sér., 9, 16), after having examined a large number of commercial bismuth salicylates, comes to the following conclusions: The bismuth salicylates are very unstable, their composition varying, hence no dependence can be placed upon their therapeutic action. They are decomposed by saccharine solutions, alcohol, glycerin, acids, alkalies, magnesium carbonate, etc. They do not possess the character of a salt, but are to be regarded as a molecular compound of bismuth oxide and salicylic acid. Since the compound is more or less decomposed by simple washing with water, it follows that the commercial bismuth salicylate consists merely of a mixture of bismuth subnitrate and salicylic acid.

Bismuth Subgallate.—F. A. Sieker (Pharm. Rund., 1895, 63) used the following process: (*a*) 57.2 Gm. of bismuth subnitrate (assaying 81.4 per cent. Bi_2O_3) was dissolved with the aid of heat in 71 Gm. of commercial nitric acid (sp. gr. 1.36) diluted with 12 C.c. of water. After cooling this solution it was gradually diluted with 75 C.c. of water, which did not cause precipitation. The solution was filtered and precipitated by pouring into it under constant stirring a solution consisting of 37.8 Gm. (theory requires 37.6 Gm.) of gallic acid in 800 C.c. of water. The gallic acid was dissolved with the aid of heat, but the solution was cooled to about 30° C. before being used. The resulting precipitate was washed by decantation until the washings were but faintly acid. It was then collected on a filter and washed with the aid of suction caused by flowing water until the washings no longer gave a perceptible reaction with diphenylamin T. S. The subgallate was then dried at about 55° C. and sifted, when a soft, bright yellow powder resulted. It was entirely soluble in sodium hydroxide solution, and therefore free from subnitrate. When treated with diphenylamin T. S. according to Fischer's method, it did not give a reaction for nitric acid.

The composition of bismuth subgallate is variously given by (1) B. Fischer, (2) B. Fischer and Grutzner, (3) Causse, and (4) Voswinkel. Its composition is variable, and appears to be due to the degree of hydration.

Bismuth Subsalicylate.—B. Fischer recommends the following process: one molecule each of salicylic acid and freshly precipitated bismuth hydroxide are heated together with the necessary amount of water on the water-bath; filter, collect and dry the residue at 80° to 100° C. on porous tiling.—Pharm. Centralh., 1895, 92, 169.

Basic Bismuth Tartrate.—$[C_4H_4O_6.2Bi(OH)_2]$. To two molecules of bismuth hydroxide made into a paste with water, one molecule of tartaric acid is added; the product is then evaporated to dryness on a water bath.—Alumni Jour., 1894.

Bismuthol is the name given a new remedy introduced by a Berlin pharmacist. It occurs as a white crystalline water soluble powder and is designated as a bismuth-sodium-phospho-salicylate. It is accredited with all of the antiseptic and antipyretic properies of its constituent parts, and is claimed to be a most powerful and absolutely non-toxic antiseptic. It is odorless and of rather agreeable taste. It is to be used in 20 per cent. dusting powder, or 1 to 10 per cent. ointment.—Amer. Drug., etc., 1894, 365.

Bismuthi Sulphis.—This is described (Merck's Rep., 1894, 44) as a white powder soluble in acids only, when sulphurous acid is set free from the sulphite of bismuth, and is again converted into sulphuretted hydrogen, by this means becoming antiseptic and antifermentative.

On the strength of these experiments P. Cesaris and A. Rachetti recommend sulphite of bismuth as a remedy for abnormal symptoms of fermentation in diseases of the stomach and the bowels. According to experiments of Polacci, a medium-sized dog stood the effect of 3 drachms of the preparation during nine successive days, and no prejudicial consequences were observed. Bismuth sulphite has also an anthelmintic effect.

Boral and Cutol.—These two bodies are aluminum boro-tartrate and boro-tannate respectively. The former is soluble in water, the latter is not. They are both strongly astringent, and are designed as medicaments for dermatological cases. Erysipelas and gonorrhœa are two of the diseases which they are chiefly advised for. Cutol contains 76 per cent. of tannin, 13.2 of alumina, and 10.7 of boric acid.—Leuchter in Pharm. Centralh., 1894, 601, 687. (See, also, Apoth.-Zeit,, 1894, 763).

Borsalicyl, an Antiseptic.—Borsalicyl is an introduction of L. Bernegau. It is prepared (Apoth. Ztg., 1894, 876) by thoroughly triturating 32 parts of sodium salicylate with 25 parts of finely pulverized boric acid and a little water. The mass quickly hardens, and is then dried and powdered. The following preparations are recommended for all cases where boro-lanolin, boro-glycerin-lanolin, myrrh-cream, and the like are employed: (1) *Borsalicyl Cream*—Heat on a water-bath 20 parts of borsalicyl with 40 parts of arnica-glycerin, and add 18 parts of lanolin and 22 of vaselin. Arnica-glycerin is obtained by macerating for a week 1 part of arnica

flowers in 9 parts of glycerin, and filtering. (2) *Borsalicyl Gauze*—Dissolve 25 parts of borsalicyl in 60 parts of hot distilled water, add 3 parts of glycerin, and impregnate with this 40 parts of pure absorbent gauze, express carefully, and dry on wooden staves. Borsalicyl gauze, like all aseptic dressings, is best kept in benzoinated paper.

Brassikon, a new headache cure, consists of a solution of 30 minims of oil of peppermint, 90 grains of camphor, 70 minims of ether and 6 drops of oil of mustard in three fluid drams of alcohol.—Amer. Drug. and Pharm. Rec., 1894.

Bromalin an Antiepileptic.—Bromalin is the trade name for hexamethylenetetraminebromethylate, $C_6H_{12}N_4.C_2H_5Br$. It forms colorless laminæ, or a white crystalline powder, freely soluble in water. The solution has but little taste. When heated on platinum foil it burns up slowly but completely under strong inflation and separation of carbon. It liquefies at about 200° C., with partial decomposition. When heated with sodium carbonate, it evolves formaldehyde, and in the solution supersaturated with hydrochloric acid, bromine can easily be detected. Bardet (E. Merck's "Bericht," p. 46) has employed bromalin (which he calls "bromethylformin"), with very good success as a nerve sedative, in children and women, in doses of 2 to 4 grams. Fere has found it beneficial in epileptics. Though less powerful than the alkaline bromides, it has none of their untoward by-effects. Laquer reports that bromalin is well borne by neurasthenics and epileptics. The dose of bromalin is about double that of potassium bromide, and is best prescribed in wafers, or in mixture sweetened with orange-peel syrup.

Butyromiel is the name applied by Pauliet (Rev. de Therap. Med. Chir.) to a mixture of two parts fresh (unsalted) butter, with one part of honey. It is prepared simply by trituration, and is recommended by Pauliet as a substitute for cod-liver oil.—Pharm. Centralh., 1894, 429.

Calcium Borate may be obtained by mixing a solution of borax with one of calcium chloride. Alberta (Pharm Centralh., 1894, 672) employs it in "weeping" eczema, burns, and fœtid perspiration; also, internally against infantile diarrhœa, in doses 30–40 centigrammes.

Creosote-Calcium Hydro-Chlorophosphate is described (Merck's Bericht, 1894, 78, as a white, syrupy mass, consisting of a mixture of creosote carbonate and dry calcium hydrochlorophosphate. It has been employed against phthisis and scrophulosis in the following emulsion:

Creosote Calc. Hydrochlorophosph.	5 to 10 Gm.
Mucilage Chondrus	15 Gm.
Oil Sweet Almonds	25 Gm.
Syrup Tolu	25 Gm.
Orange-flower Water	75 Gm.

Teaspoonful twice daily; shake well before using!

Calcium Sulphophenate, an Antiseptic.—Mention was made of magnesium sulphophenate by Tarozzi, as a laxative and intestinal antiseptic. The same author now reports (Pharm. Zeitsch. xxxiv., 121) on calcium sulphophenate, which he prepared by the action of sulphophenic (sulphocarbolic) acid on calcium carbonate. It is described as a white, almost odorless, stable, astringent bitter powder, freely soluble in water and in alcohol. T. claims for this new compound strong antiseptic disinfectant and astringent properties, which would render it of especial value in obstinate cholera morbus and wherever cicatrization of an internal or external lesion is desired. Calcium sulphophenate is given internally in 1 per cent. aqueous solution, sweetened.

Cadmium Salicylate [$(C_6H_4OH.COO)_2Cd.$]—Cadmium hydroxide and salicylic acid are heated together in molecular proportions in the presence of water, until reaction is over; the resulting solution should have a slight acid reaction, adding, if necessary, a little more salicylic acid. The solution is then evaporated and crystallized. This body forms a crystalline colorless powder, of sweetish astringent taste, soluble in 68 parts of water more so in alcohol, ether and glycerin. The antiseptic action of this salt is more marked than in the other cadmium compounds.—Pharm. Centralh., 1895, 90; 1894, 672. (See, also, P. Cesarisin, Boll. Chim. Farm. 1894, 417).

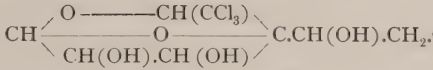
Carniferrin is described (Pharm. Centralh., xvi., 61) as an absorbable compound of iron and phosphosarcolactic acid. It occurs as a tasteless powder, soluble in diluted acids and in alkalies. It is said to contain 30 per cent. of iron. The adult dose is 0.5 Gm. (7½ grains) a day; children's, 0.2 to 0.3 Gm. (3 to 4½ grains) daily.

Chloral Caffeine is made by bringing chloral and caffeine together either in alcoholic or aqueous solution according to a patented process. It has the advantage of being easily soluble in water.—Pharm. Centralh., 1894, 476.

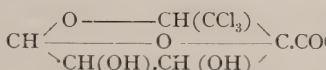
Analogues of Chloralose.—In dealing with the isomers of glucose, arabinose, and xylose, Richet and Hauriot have obtained compounds quite analogous to chloralose, and have termed them arabinochloralose and xylochloralose. The physiological action of these bodies is not identical with that of chloralose. The arabinose compound is only half as toxic, and induces quiet sleep without any tetanic effect. Xylochloralose, on the other hand, is less hypnotic, and produces more of the tetanic symptoms than chloralose.—Rép. de Pharm., 1895, 29.

Chloralose.—A. Petit and M. Polonovski.—Heffter has already shown that chloralose and parachloralose are dextrogyrate. The authors have determined the rotatory power of chloralose, and find that for a 5 per cent. solution in 98 per cent. alcohol $[\alpha]_D = +19.4°$ at 20–22°, whilst a solution in 4 per cent. potash gives $[\alpha]_D = +15°$ at the same temperature.

Contrary to the statement of Hauriot and Richet, both chloralose and parachloralose reduce Fehling's solution on boiling, remaining indifferent towards ammoniacal silver nitrate. If, however, ammonia be added in sufficient quantity to redissolve the precipitate formed on adding sodium hydroxide to silver nitrate, a solution is obtained which is reduced by chloralose at a temperature of 70°. Hot solutions of the alkalies eliminate chlorine from chloralose and parachloralose with the development of a brown coloration, and a similar result, accompanied by evolution of carbonic anhydride, is produced by sodium carbonate. When boiled for some hours with dilute baryta water, chloralose gives rise to products identical with those obtained on subjecting glucose and chloral to similar treatment, and the authors therefore conclude that under these conditions chloralose is first split up into glucose and chloral, these substances undergoing further decomposition in presence of the hot alkali. The behavior of chloralose towards dilute acids fully confirms this view. When boiled for three hours with 20 per cent. sulphuric acid, chloral and glucose are formed, and if hydrochloric acid is employed, the reaction proceeds almost quantitatively; hydrolysis is also effected when chloralose is boiled with distilled water. Owing to its insolubility, parachloralose undergoes decomposition more slowly than the isomeric compound, although identical products are obtained. The authors consider that the ease with which chloralose is broken up into glucose and chloral points to the constitution



this view being in agreement with the formation of tetra-substitution derivatives by the action of acids and acid chlorides on it. Chloralic acid, which is obtained by oxidizing chloralose, is represented by the formula



—Bull. Soc. Chim., 1894, 125.

Chroatol is another new dermic. It presents itself as greenish-yellow crystals of a pronounced aromatic odor; insoluble in water, slightly soluble in ether and in chloroform, but more so in alcohol and in glycerin. Experiments instituted on guinea-pigs show that it can be taken in quantities up to 0.75 Gm. per kilogram of weight (6 grains to the pound), without producing any poisonous effects. In clinical medicine, it was applied to the skin suspended in collodion, in a case of refractory psoriasis in which pyrogallic acid and chrysophanic acid had failed, and produced, it is stated, rapid amelioration and finally a cure. It is further reported that it has also been used successfully in a number of cases of alopecia and porrigo decalvans, in 10 per cent. pomade or dusting powder in the treat-

ment of rebellious varicose ulcers. A curious fact in regard to chroatol is, that many patients upon whom it had been thus applied, complained, of a bitter taste in the mouth and throat. This is probably due to the elimination of the remedy by the respiratory tract.—Nat. Drug., 1894, 205.

Chloroiodolipol.—A chlorine substitution product of phenol, creosote and guaiacol, recommended by Zambeletti for inhalation in treatment of diseases of the air passages.—Alumni Jour., 1894.

Chlorolin.—This is an antiseptic and disinfectant in which the mono and trichlorphenols are the most important constituents. It is recommended particularly for the disinfection of urinals and water-closets. For use in surgery and gynecology 2 to 3 per cent. solutions are recommended; as a gargle, ½ to 2 per cent. solutions should be used.—Pharm. Centralh., 1895, 63.

Collasin is said to be a solution of soluble gun cotton and camphor in acetone. It is employed for the same purposes as collodion.—Alumni Jour., 1894.

Creosal, an Antiseptic Astringent.—Creosal is the name given by Balland and Dubois (Pharm. Ztg., xl, 271) to a compound of creosote and tannic acid. It is obtained by heating equal quantities of beechwood creosote and pure tannic acid to 80° C., and adding, gradually, a certain quantity of phosphorus oxychloride.

The temperature is then raised, and so soon as the fumes of hydrochloric acid cease to be given off the mass is poured into a cold, diluted solution of sodium hydroxide. From this dark-brown liquid the creosal is precipitated by means of ordinary salt; it is then well washed and dried on the steam-bath. The finished product occurs as a dark-brown, very hygroscopic powder, which is readily soluble in water, alcohol, glycerin, and acetone, but insoluble in ether and aqueous solutions of the fatty acids. Creosal is precipitated from its solutions by the mineral acids, sodium chloride, potassium acetate, and most of the other mineral salts, and by the alkaloids, proteid substances, and starch. Creosal is an astringent similar to tannic acid, and has also antiseptic properties. Its solutions have a creosote-like taste and odor, and are said to be devoid of caustic action. It may be employed either in substance, mixed with sugar, or in aqueous solution. It may be given in daily doses of 3 Gm., representing about 1.8 Gm. of creosote.

Creosal is reported as having given good results in inflammatory conditions of the mucous membrane of the larynx and bronchial tubes; but definite data are not given.

Soluble Cresol Preparations.—An examination of the most important soluble preparations of the market gave the following results:

Sapocarbol.—An aqueous solution of pure or crude phenol in soap, in-

tended as a substitute for lysol. This contained from 37 to 44 per cent. phenol.

Lysol.—An aqueous neutral solution of cresol in soap. This contained 50 per cent. of cresol.

Solveol.—A neutral solution of cresol in aqueous sodium cresylate. This contained 23.6 per cent. of cresol.—C. Engler and E. Dickhoff in Archiv. der Pharm., 1894, 351.

Cryostase.—A German chemist has discovered a mixture which possesses the peculiar property of solidifying when heated and liquefying again on cooling. The mixture consists of equal parts of phenol, camphor and saponine, with a small quantity of turpentine. It is said that saccharate of lime in concentrated solutions possesses this peculiar property. This mixture has been termed cryostase.—Rép. de Pharm., 1894, 466.

Crystallose is the name given to readily soluble crystalline sodium salt of chemically pure saccharin. Owing to the water of crystallization which it contains, its sweetening power is but 400 times that of cane sugar, instead of 500, as is that of refined saccharin.—Pharm. Centralh., 1895, 61.

Subgallate of Bismuth (*Dermatol*).—According to A. Hartz (Pharm. Rund., 1894, 182) 306 Gm. of bismuth subnitrate are dissolved in a mixture of 328 Gm. of nitric acid (sp. gr. 1.35), and 200 Gm. of water; the fluid is then filtered through glass wool and evaporated to 600 Gm. After five or six hours a crystalline mass results; from this the mother-liquor is drained off. The crystals are then dissolved in 980 Gm. of glacial acetic acid, and mixed with 8 liters of water. To this is added, with constant stirring, a hot solution of 188 Gm. of gallic acid in 8 liters of water. After settling, the precipitate is washed five or six times by decantation with hot water; it is then drained off and dried on porous plates or tiles, at a temperature not over 80° C.

Dermol is the name given by S. Torjesen Burdujeni (Pharm. Ztg., 1894, 486), in analogy with dermatol, to a preparation destined to serve in the treatment of skin-diseases and obtained by treating a bismuth salt [bismuth oxide?] with chrysophanic acid. The resulting bismuth chrysophanate—to which the author ascribes the formula $Bi(C_{15}H_9O_4)_2.Bi_2O_3$—is described as an amorphous, yellow powder of neutral reaction and insoluble in the ordinary solvents. It dissolves in nitric acid with a saffron-yellow color, in sulphuric acid with a red-violet color. It is principally applied in the form of ointments.

Diacetylalphadiamidophenetol.—This is another new medicament, prepared by a patented process consisting in the action of acetic acid anhydride, glacial acetic acid, or acetyl chloride, on alphadiamidophenetol (or its hydrochlorate) in the presence of fused sodium acetate; freeing the product obtained from its acetic acid by means of forcing steam through it, and then recrystallizing from alcohol. Clinical data are yet wanting.—Pharm. Centralh., 1894, p. 687.

Dihydroresorcin.—According to Chem Zeit. (Rep.), 1894, 174, this is prepared by the following patented process: It is obtained from a boiling aqueous solution of resorcin by the simultaneous introduction of carbonic acid and sodium amalgam. The unaltered resorcin is washed out of the solution by shaking it with ether, and the residue is acidified and again treated with ether, which takes up the dihydroresorcin. This substance, after distilling off the ether, appears as brilliant prismatic crystals, with a melting point of 104°–106° C. It is freely soluble in water, alcohol and chloroform, and soluble with great difficulty in carbon disulphide, anhydrous ether and ligroin. It is used as an antiseptic.

Solutions of Dulcin in Fixed Oils.—In order to mask the unpleasant taste of fixed oils employed in medicine, C. Bechert (Apoth. Ztg., 1894, 951) proposes saturating them with dulcin. He states that one part of dulcin will dissolve in 237 parts castor oil, 296 parts cod-liver oil, and 545 parts almond oil. The prescriber might find these facts of practical value in making such remedies palatable, particularly in emulsions.

Emulsin is the name of a paraffin oil which has been placed on the market in France, which has been oxidized under pressure. It is (Jour. d. Pharm. v. Els. Loth., 1894, 128) a neutral odorless liquid, forming a permanent milky mixture with water, and is recommended for the preparation of emulsions. The editor of Pharm. Centralh. points out that this description fits vasogen, while the introducer shows but a scanty knowledge of chemistry, as the name emulsin has already been applied to the ferment of the almond.

Eitnerin is the name given by Gehe to an article which they propose to use as a substitute for egg albumen in manufacturing leather.—Pharm. Centralh., 1894, 550.

Ferratin: its Dietetical and Therapeutical Employment.—O. Schmiedeberg.—The iron compounds of albumin, like other iron compounds, are at once blackened by ammonium sulphide in alkaline solution. If, however, alkaline solutions of such iron albuminates are kept some time, or are heated for a short time, they are not at once blackened by ammonium sulphide, although they are blackened by it after the lapse of some time. Iron compounds which are not at once blackened by ammonium sulphide are obtained from many organic compounds which contain hydroxyl, such as tartaric acid, citric acid, mannitol and glycerol. Ferratin, a "ferri-albuminic acid" containing 6 per cent. of iron, is obtained by boiling pig's liver with water, and adding tartaric acid to the cold filtrate. The ferratin contained in the liver is the source of iron for the formation of blood, and its disappearance from the liver can be detected in cases of deficiency of iron and loss of blood. Iron salts are, as a rule, difficult to assimilate; ferratin, however, after repeated doses, is not injurious either to the intestines or kidneys; and much larger quantities of iron may be injected di-

rectly into the blood in the form of ferratin than in the form of iron salts. Chem. Centr., 1894, 741.

Ferropyrine consists (Pharm. Centralh., xvi., 59) of 3 molecules of antipyrine and one molecule of ferric chloride, and thus contains 64 per cent. of antipyrine, 12 per cent of metallic iron, and 24 per cent. of chlorine. It occurs as an orange-red, impalpable, permanent powder, soluble in five parts of water at 15° C., but requiring nine parts of boiling water for solution. Heating, therefore, precipitates it from its cold solution, in the form of ruby-red leaflets, melting between 220° and 225° C. It is soluble also in alcohol, wood spirit, or benzol; but almost insoluble in ether. Aqueous solutions of ferropyrine are of a strong, blood-red color. When a small quantity of the compound is thrown into a large amount of water, a nearly colorless solution results. This is explained by partial dissociation, since the addition of antipyrine restores the red color. Alkalies, even bicarbonates, precipitate ferric hydroxide from aqueous solutions of ferropyrine, while weak solutions of the latter in hydrochloric acid are stable. As regards testing ferropyrine, its peculiarity of solubility is recommended as an identity test. One Gm. dissolved by agitation in 8 C.c. of cold water separates out, on boiling the solution, in the form of leaflets, which melt between 220° and 225° C. As regards purity tests, the solution of 1 Gm. of ferropyrine in 100 C.c. of water must be perfectly clear, without deposit of ferric oxide; and on the addition of a few cubic centimeters of ammonia water, ferric oxide precipitates. The filtrate, after being boiled down to 5 C.c., admixed with 30 C.c. of 30 per cent. soda solution, three times extracted with 10 C.c. of warm benzol, and evaporated to dryness, should yield 0.6 Gm. of antipyrine (M. P., 113° C.), corresponding to 64 per cent. Cubasch has employed ferropyrine in anemia, chlorosis, migraine, divers neuralgias, and in other affections where a combination of iron and antipyrine appeared to be indicated. The dose is 0.5 to 1 Gm., best given with peppermint oil sugar. Topically ferropyrine has proved serviceable as an astringent and hæmostatic, in gonorrhœa (1 to 1½ per cent. solutions), nose-bleed (pure or in 20 per cent. aqueous solution), etc. Ferropyrine is said to be perfectly free from the caustic action of ferric chloride, and to be totally devoid of the hygroscopicity and easy decomposibility of the latter salt.

Formal as an Antiseptic.—A. Trillat having demonstrated that the proximity of a cloth moistened with a weak solution of formic aldehyde serves to arrest the putrefaction of meat, has based a system of disinfection upon this property, and now publishes the results of a later series of experiments on the disinfection of rooms. The apparatus employed is a kind of lamp capable of transforming daily about 5 Kgms. of methylic alcohol, by incomplete combustion, into the vapor of formal, the yield of the latter being about 25 per cent. of the alcohol consumed. The lamp consists of a copper cylinder, 20 Cm. high by 16 Cm. wide, which

rests upon a spirit reservoir of two litres capacity, and is covered at the top by a lid. At each extremity of the cylinder there is a row of draught holes covered by a similarly perforated movable ring, so that the entry and exit of air can be easily regulated as in a Bunsen burner. The lamp has a large round wick, about three or four Cm. above which is fixed a piece of platinum gauze. In use, the lamp is lighted, and when the platinum gauze in the cylinder has been warmed for a few seconds the draught-holes are closed. It is not long before the flame is extinguished, and if at the precise moment the draught-holes are opened wide, the platinum gauze becomes incandescent. With a little maneuvering the supply of air may be so regulated that a dull red incandescence is maintained, and the lamp then continues to act, burning without a flame. The vaporized methylic alcohol is instantaneously oxidized to formic aldehyde on coming in contact with the platinum, and the aldehyde vapor escapes through the upper draught-holes. It was found that the action of the vapor was as effectual in the upper as in the lower parts of rooms, and that in a room of 20 M^3 all germs were killed by it in 8 hours, the weight of methylic alcohol burned being 0.200 Gm. In the course of further experiments it was proved that the presence of water mitigated the antiseptic action of the formal in a degree that was proportional to the humidity of the atmosphere. Surgical instruments and metallic articles, as well as cloth, etc., were not deteriorated by the action of the formal vapors, though certain colors were affected, materials dyed with rosaniline derivatives, for example, becoming somewhat violet in tint. The odor of the formal, it is noted, may be removed from rooms by strong currents of air, or by exposing open vessels containing ammonia.—Nouv. Rem., x., 464 ; Pharm. Jour. Trans., 1894, 353.

Antiseptic Properties of the Vapors of Formal (*Formic Aldehyde*).—A. Trillat proves that the vapors of formal kill bacillus anthracis, Ebert's bacillus, the bacillus coli, etc.—Compt. rend., vol. cxix., No. 14.

Gaseous Formoldehyde.—R. Cambier and A. Brochet prepare this aldehyde for disinfection in two ways: 1. By the depolymerization of trioxymethylene by heat, and, 2. Direct production by the incomplete combustion of methylic alcohol. Formaldehyde possesses antiseptic properties only when it is in the condition of a gas. On cooling, ordinarily, it is spontaneously polymerized to an inert solid. If it is allowed to cool in the presence of much air, this process does not take place, and hence the formaldehyde retains its bactericidal properties. Experiments made at the bacteriological laboratory of Montsouris have enabled the authors to sterilize the ordinary dust of rooms, as well as cultivations of various pathogenic micro-organisms.—Compt. rend., 1894, No. 15, 607.

Formaldehyde and Salts of NH_4.—Brochet and Cambier, having proved that formic aldehyde converts monomethylamine and hydroxylamine hydrochlorates into trimethylene-triamine hydrochlorate and formaldox-

ime, respectively, show that a similar reaction occurs when it acts upon ammonium chloride. In the cold the solution becomes strongly acid and capable of dissolving calcium phosphate, chalk, etc. Trimethylene-triamine hydrochlorate appears to be first formed, but the final product of the reaction is hexamethylene-amine, a solution of which, when treated with an excess of hydrochloric acid, yields crystals of ammonium chloride anew. When the reaction takes place under the influence of heat, the final product is trimethylamine hydrochlorate. In the case of ammonium sulphate, Plöchl has shown that the corresponding salt of trimethylamine is formed, and it is said that other salts of ammonium yield similar results.—Compt. rend., cxx., 557.

Formalin and Food Stuffs.—Weigle and Merkel have investigated the action of formalin with the view of ascertaining if it could be used as a food preservative. They find that in the case of milk its use is followed by marked changes in the behavior of the casein, which, though obscure in their origin, are such as to warrant the prohibition of its use for preserving this food substance. They also consider that exact investigations should be undertaken, with the object of ascertaining the best means of detecting the addition of formaldehyde, as in the case of boiled milk they were not able to detect it with certainty.—Forschungs-Ber., ii., 91.

Formaldoxime.—Dunstan and Bossi (Apoth. Ztg., 1894, 605) report that formaldoxime is a colorless, strongly refractive liquid, boiling between 84° and 85° C. They obtained it by shaking out a freshly-prepared cold mixture of aqueous formaldehyde and hydroxylamine solutions with ether, and fractional distillation. On cooling, it quickly assumes a polymeric form—an amorphous, white mass. It has not yet been obtained in crystalline form. It burns with a yellowish flame, whilst evolving hydrocyanic acid: $CH_2NOH = H_2O + HCN$. It is decomposed by concentrated hydrochloric acid into formaldehyde and hydroxylamine, and by aqueous solutions of the alkalies into hydrocyanic acid and water; whilst it forms very unstable combinations with the alkali metals. The sodium compound, CH_2NONa, is crystalline, explodes when heated, and forms sodium cyanide, with the loss of water. It strongly reduces the salts of silver, gold, copper and mercury. By introducing dry hydrochloric acid gas into an ethereal solution of formaldoxime, a crystalline hydrochlorate is obtained, of the formula $(CH_2NOH)_3HCl$; by water it is decomposed into hydrochloric acid and formaldoxime. The latter may be distilled off after neutralizing the hydrochloric acid.

Gallicin in Eye Affections.—According to C. Mellinger, gallicin is the methyl ester of gallic acid, and corresponds to the formula

$$C_6H_2\begin{cases} COOCH_3 \\ OH \\ OH \\ OH \end{cases}$$

The method of preparation patented by Sandoz & Co., consists in warming a solution of gallic acid or of tannin in methyl alcohol with hydrochloric acid gas or concentrated sulphuric acid. On cooling, the gallicin crystallizes out from methyl alcohol in anhydrous rhombic prisms; from hot water, however, it separates in very fine snow-white milky needles. The modification crystallized from water is most suitable for medical use; it melts at from 200° to 202° C., as also does the anhydrous form. It dissolves easily and without color in hot water, in warm methyl and ethyl alcohol, and in ether. Gallicin resembles resorcin and pyrogallol in its constitution, but is preferable to these, since it is non-poisonous. The author has obtained good results with gallicin in catarrhal affections of the eye. Gallicin is applied in the same manner as calomel by means of a camel's hair pencil. Considering the lightness of the body, a gram should be ordered for an eye powder.—Monatsh. f. prak. Derm; Pharm. Jour. Trans., 1895, 1055.

Gallanol.—According to E. Merck's Report, 1894, 66, Nicolas, Bayet, Barendt, and Joseph have confirmed the favorable reports of Cazeneuve and Rollet on the use of gallanol in psoriasis; in eczema, too, prompt results were invariably had. Gallanol appears to be specially indicated in all genuine mycoses of the skin: in favus, tricophytosis, and prurigo. As in other dermatoses, it is advisable to remove the desquamated scales by means of baths, frictions with soft soap, or other mechanical measures. The following is a favorite formula:

Gallanol	10 parts.
Ammonia	1 part
Alcohol	50 parts.

Gallobromol has been successfully employed also in cystitis and epididymitis (by irrigation with 2 to 4 per cent. solutions) and in eczema madidum and crustosum (1 to 2 per cent. solutions, powders or ointments). The following are eligible formulas:

1.—Gallobromol	3 Gm.
Distilled water	200 "

For injection 4 to 5 times a day (in gonorrhoea, cystitis, and epididymitis; and as a lotion in eczema).

2.—Gallobromol	3 Gm.
Distilled water	100 "

For injection, in chronic gonorrhœa.—Ibid., 67.

Glycerinophosphate Preparations.—Of the salts of glycerinophosphoric acid, that of calcium appears to be used most. Gay (L'Union Pharm.,

xxxvi. 10) recommends the following formulas as sufficient for all practical requirements:

1.—PLAIN SOLUTION.

Calcium Glycerinophosphate	10–30 Gm.
Distilled Water	to make 1000 C.c.

Some physicians prescribe 1 : 30 solutions. But in these, solution is sometimes incomplete; the addition of citric acid—one-tenth the quantity of salt—facilitates it and promptly renders the mixture limpid. The above solution has an earthy taste, and cannot be kept for a long time without alteration. The addition of 2 or 3 Gm. of chloroform to every liter favorably modifies the taste and increases the stability. The association of arsenic with phosphorus is also useful, and may be accomplished by adding to the above formula 10–50 Cgm. of sodium arsenate.

2.—EFFERVESCENT SOLUTION.

Calcium Glycerinophosphate	10–30 Gm.
Citric Acid	5–7 Gm.
Sodium Bicarbonate	4 Gm.
Distilled Water	to make 1000 C.c.

Dissolve the glycerinophosphate and the citric acid in the water in a bottle, add the bicarbonate, and cork immediately. Tartaric acid must not be used, because it gives rise to a precipitate.

An effervescent solution may also be prepared by placing the salt, with 1–3 Gm. of citric acid, into the bottle, filling the latter by means of a siphon with seltzer water, and corking at once. The addition of sodium arsenate is also permissible with this formula.

3.—SYRUP.

Calcium Glycerinophosphate	16–30 Cgm.
Citric Acid	1 "
Sugar	610 "
Water	340 "
Syrup Bitter Orange Peel	39 "

Dissolve the salt and acid in the water, and in the solution dissolve the sugar, in the cold; then add the syrup of orange or any other aromatic syrup or sweetening agent, such as the following:

Extract Kola	6 parts.
Extract Bitter Orange	3 "
Glycerin	30 "

Dissolve the extracts in the glycerin with the aid of heat, let cool, mix with the above syrup, and strain. This syrup may be arseniated by the addition of 10–50 Cgm. of sodium arsenate, dissolved simultaneously, with the glycerinophosphate.

4.—CHOCOLATE PASTILLES.

Calcium Glycerinophosphate	15–30 Cgm.
Powdered Chocalate	1 Gm.
Syrup	a sufficient quantity.

Mix the salt and the chocolate, knead with the minimum quantity of syrup, and make into a pastille.

It is not deemed advisable to administer calcium glycerinophosphate in the form of elixir, since alcohol precipitates the salt from its aqueous solution. (See also Jour. Pharm. Chim., 1895, 247; Jour. de Pharm. d'Anvers, 1895, 81, and Pharm. Centralh., 1895, 212.)

Calcium Phosphoglycerate.—Portes and Prunier (Jour. Pharm. Chim., 1895, 393) have prepared the acid by heating together 3 kgm. of 60 per cent. liquid phosphoric acid and 3.6 kgm. of pure glycerin, at 110° for six days. The mixture should be agitated three or four times a day. After two days it becomes colored and emits vapors. When completely cold the acid is saturated with a mixture consisting of 500 Gm. of calcium carbonate in 2 kgm. of water. The resulting product is allowed to stand for two or three hours, when saturation is completed by a further careful addition of calcium carbonate and water.

The solution is filtered, precipitated with alcohol, the precipitate collected by decantation and allowed to become air-dry; it is then dissolved in cold water, filtered, and the solution brought very carefully to dryness.

When thus obtained the salt is a white, somewhat crystalline powder, soluble in fifteen parts of cold water, almost insoluble in boiling water, and insoluble in alcohol. The solution does not give the reaction of phosphoric acid when mixed with ammonium molybdate. The use of this salt has become established in some of the hospitals of Paris. Its especial value lies in its perfect neutrality and in the readiness with which it is assimilated.

Glycerophosphate Salts.—Petit and Polonovsky have examined a number of these salts with the following results:

Calcium Glycerophosphate occurs as a white powder; one part is soluble in 30 parts of water at 20°; on heating it is precipitated in the form of scales; reaction of aqueous solution is alkaline; the solution gives precipitates with soluble oxalates, carbonates, phosphates and lead salts. The solution should give no ppt. with magnesia mixture, ammonium molybdate (on heating it is decomposed), in the cold, nor with uranium acetate. Moisture on heating to 130° should not be more than 3 per cent. Pyrophosphate residue should be 55.5 to 56.5 per cent. Phosphoric acid should be 30–31 per cent. The formula is $C_3H_7O_3PO<\begin{matrix}O\\O\end{matrix}>Ca+H_2O$.

Strontium Glycerophosphate is a white powder; one part is soluble in 20 parts of H_2O at 20°; on heating to boiling the salt is ppt. from solution. The reaction is alkaline and the solution gives ppt. with oxalates, car-

bonates, phosphates and lead salts. Uranium acetate does not give any insoluble compounds. The moisture should not be greater than 4 per cent. The pyrophosphate residue should be 63 to 64 per cent; the phosphoric acid 26 to 27 per cent.

Iron Glycerophosphate occurs as a grayish-green powder; the solution is colored brown; 1 part is soluble in 10 parts of water at 20°; warming assists the solution; in heating the solution to boiling there is no ppt. The reaction is faintly acid and gives ppt. with oxalates, carbonates, phosphates, lead salts and alkalies, with the latter a greenish-brown ppt. It does not give ppt. with barium salts nor sulphates. Moisture should not be more than 4 to 5 per cent. upon heating at 130°. The pyrophosphate residue is 56 to 57 per cent. and the phosphoric acid is 27 to 28 per cent. The formula is $C_3H_7O_3PO<\begin{matrix}O\\O\end{matrix}>Fe + 2H_2O$.

Lithium Glycerophosphate is a white crystalline powder; one part is soluble in 3 parts of water; upon heating the solution to boiling there is no ppt. formed. The reaction of the solution is alkaline, and it does not give a ppt. with carbonates, phosphates and lead salts. It reacts similarly to the iron salt. Moisture should not be greater than 2 to 3 per cent. upon heating to 130°. The pyrophosphate residue is 54 to 55 per cent., and the phosphoric acid is 38 to 38.8 per cent. The formula is $C_3H_7O_3PO<\begin{matrix}OLi\\OLi.\end{matrix}$

Sodium Glycerophosphate occurs as a white hygroscopic mass. It is soluble in all proportions in water. The solution is not ppt. in heating to boiling and is ppt. only with lead salts. This salt should behave similarly to the iron salts in not giving ppt. It requires heating to 140° to lose all of its moisture. It should yield 56 to 57 per cent. of pyrophosphate residue, and contains 30 to 30.5 per cent. of phosphoric acid. The formula is $C_3H_7O_3PO<\begin{matrix}ONa\\ONa\end{matrix} + H_2O$.

None of the glycerophosphates upon treatment with alcohol and then evaporating the latter upon a water-bath should show glycerin.—Chem. Zeit., 1894, 1192. (Original in Jour. Pharm. Chim., 1894, 193).

Glyceroalcohol.—The formula is given (Martindale's Extra Pharm., 8th Ed.; Amer. Jour. Pharm., 1895, 330) as follows: Glycerin, 333; distilled water, 146; and alcohol, a sufficient quantity to measure 1000. It has a specific gravity of about 1. It is much used in Paris as a solvent of alkaloids and other proximate principles, keeps indefinitely, and does not readily evaporate. It could doubtless be often used with advantage by American pharmacists for the making of standard solutions of alkaloids, etc.

Boro-Salicylic Glycerole.—Boric and salicylic acids, when heated with glycerin, are dissolved in large quantities. On cooling, however, a

thick and granular pasty mass results. If the solution is now heated almost to boiling and a trace of calcined magnesia is added, it remains perfectly limpid on cooling. The product is also quite soluble in water, and it is easy to prepare extemporaneously a solution containing equal quantities of the two acids in a state of concentration not otherwise obtainable. Nor are the antiseptic, properties of either body in any way impaired. The proportions are:

Boric acid	10
Salicylic acid	10
Distilled water	10
Glycerin	40
Mag. oxid.	1

—Jandon, in Rép. de Pharm., 1894, 487.

New Guaiacol Salts.—H. Dubois (L' Union Pharm., 1894, 483) describes guaiacol succinate and guaiacol phosphate, two new compounds of guaiacol. The former may be prepared either by causing phosphorus oxychloride in theoretical proportion to act on a mixture of guaiacol and succinic acid; or by causing succinyl chloride to act at a low temperature on guaiacol dissolved in aqueous soda solution. Guaiacol succinate has the formula $C_4H_4O_4(C_6H_4OCH_3)_2$, and occurs as white, fine needles, melting without decomposition at 136° C., insoluble in water, sparingly soluble in ether or alcohol, but freely so in chloroform, acetone, hot toluene, or petroleum ether; bromine attacks it violently, yielding substitution products. Guaiacol phosphate is obtained from the action, at a low temperature, of phosphorus oxychloride on guaiacol dissolved in dilute soda solution. Its formula is $PO(C_6H_4OCH_3O)_2$, and it occurs as colorless, hard tabulæ melting at 98° C., insolublc in water, ether, or petroleum ether, but readily soluble in chloroform, toluene, or acetone. When heated with aqueous potassa-solution to about 150° C., it saponifies. The therapeutic uses of these new salts of guaiacol are probably analogous to those of uncombined guaiacol; however, definite clinical data are yet wanting.

Guaiacol Phosphite.—Both creosote and phosphorus constitute important remedies in the treatment of tuberculosis, and Ballard has endeavored to combine these two agents into one. He has suceeeded in producing a definite compound which in La Medicine Moderne he describes as follows: "Phosphite of guaiacol occurs as a white crystalline powder, of warm but not caustic taste. It fuses at 77.5° C., is very soluble in alcohol, ether and chloroform; soluble in water, acetone, benzene, toluene and fatty oils; slightly soluble in oil of turpentine and glycerin. This substance contains 92.25 per cent. of guaiacol and 7.75 per cent. of directly absorbable phosphorus." Thus, in addition to the large proportion of guaiacol, phosphorus, an element so essential to the nutrition of the tuber-

culous, is represented in such quantity that 3.50 Gm. of phosphite of guaiacol are equivalent to 1 Gm. of phosphite of calcium and 2.50 Gm. of phosphate of calcium. Preliminary experiments on dogs have been made which allow the maximum limit for man to be fixed provisionally at from 10 to 12 Gm. per full dose, showing the compound to be sufficiently harmless to admit a full therapeutic use. It only remains to test its clinical employment. Experiments are to be undertaken upon some tuberculous patients, and in proper time the results will be reported.—West. Drug., Jan., 1895.

Hæmalbumin.—G. Kottmeyer has examined Dahmen's hæmalbumin, a preparation that has been vaunted not only as a remedy for chlorosis, tuberculosis, and many other diseases, but as a means of prolonging life, and superior in nutritive power to meat. It contains, according to Kottmeyer, 0.26 per cent. of iron, and is neither more nor less than incompletely digested blood. An apparently identical preparation can be made by mixing 50 C.c. of hydrochloric acid and 50 C.c. of water with 1000 Gm. of defibrinated blood, which then becomes soluble in boiling water. On standing, a jelly is produced, which can be broken up by hand and dried. —Pharm Post., xxviii., 101.

The Hæmoglobin and Related Products of the Market.—Chas. H. Williams has examined the following products, and the subjoined table shows (Pharm. Rund., 1894, 210), the results of his analyses in full:

	External Form.	Color.	Odor.	Taste.	Solubility.	Reaction.	Per cent. of Iron.	Gastric Digestion.	Composition.
Hæmoglobin (Merck's)	Fine powder.	Chocolate Brown.	Putrid.	Albuminous.	Slowly soluble, leaves considerable residue.	Neutral.	.504	"Acid" Hæmatin.	Methæmoglobin, oxyhæmoglobin, equal parts.
Hæmoferrum	3 grains gel. pilloids, = "pseudo-crystalline" powder.	Reddish brown,	Blood.	"	Nearly all soluble.	"	.411	"	Mostly oxyhæmoglobin. Traces of methæmoglobin.
Ferroglobin	2 grains compressed sugar coat. tablets.	"	"	Burnt albumen.	Partly soluble.	"	.299	"	Oxyhæmoglobin in the sol. portion. Hæmatin in the insol. portion.
Ferrum sanguinis (Chapoteaut)	Gelatine globules enclosing minute scales.	Brownish black.	Putrid.	Albuminous.	Leaves a large albuminous deposit.	"	.418	"	Mostly methæmoglobin. Traces of oxyhæmogl.
Ferratin	Fine powder.	Cinnamon brown.	Ethereal alcohol.	Ferruginous.	Sol. in faint alk. sol. to reddish brown sol.	"	5.707	Chloride.	No absorption bands.
Hæmogallol	Fine powder.	Snuff brown.	"	Slightly ferruginous, gritty.	Slowly in alk. sol. to greenish-yellow sol.	"	.444	Acid Hæmatin.	No absorption bands.
Desiccated Defibrinated Blood	Large scales.	Brownish black.	Putrid.	Albuminous.	Very slowly soluble.	"	.194	"	Methæmoglobin. Traces of oxyhæmoglobin.
Hæmoglobin compound	Liquid.	"	Burnt malt.	Sweet alcoholic, malty.	Readily miscible in water.	Acid.	.015	"	Mixture of methæmogl. and oxyhæmoglobin.

Hæmatin-Albumin.—Finsen (*Ugeskrift for Læge*, No. 51, 1894) has succeeded in preparing a durable preparation from blood, consisting principally of dried albumins, holding a large amount of iron. It is a dark brown powder, odorless and almost tasteless. It is prepared from the blood of the ox or pig. The albumins are separated from the extractives and salts by means of Panum's method, somewhat simplified, and after many washings the uncoagulated albumins are centrifugalized and then evaporated at a low temperature (vacuum). During the preparation measures are taken to destroy any micro-organisms that may be present. About one pound of hæmatin-albumin contains the albumins of about six pounds of blood. The remedy has been tried at several hospitals in Copenhagen with satisfactory results. It is well borne and easily assimilated. It does not cause constipation, but gives a reddish color to the stools. The dose is 1 to 2 teaspoonfuls three times a day for adults. It may be taken either pure or mixed with cocoa.

Helcosol.—J. Juresca has prepared and examined a bismuth pyrogallate containing 57 per cent. of bismuth, and protests against the name helcosol. It is soluble in concentrated nitric acid with a brown color; this solution, when heated, acquires a brownish-red color, which turns light-red in a few minutes, and finally becomes yellow. Dissolved in concentrated hydrochloric acid and diluted with water, it acquires a deep-red color on the addition of a few drops of ferric-chloride solution. Dissolved in concentrated hydrochloric acid, the addition of calcium hypochlorite turns the solution first yellow, then red.—Pharm. Post, 1895, 169.

Hæmogallol.—Kobert (Deutsch. Med. Wochenschr., 1894, 886) selected hæmoglobin of bullock's blood and caused it to be acted upon by a reducing agent, such as pyrogallol. This deoxidizing agent displaced the oxygen largely, if not completely, from the hæmoglobin, and left, as the final product, a smooth, reddish-brown, tasteless powder, containing all the constituents of normal hæmoglobin except the oxygen. To this substance he gave the name hæmogallol. It can be administered in solution, in pill or capsule form. It is absolutely non-irritating to the most sensitive stomach, and can be administered to advantage in every possible form of anæmia. According to Wm. H. Porter (The Post-Graduate, IX, 493) when hæmogallol reaches the circulating blood, it readily seizes the oxygen in the blood and is reverted back to hæmoglobin. The reproduced hæmoglobin incorporates itself promptly with the globulin elements of the red corpuscles. In case of an excessive introduction of hæmogallol into the circulation, the unoxidized hæmoglobin passes rapidly out of the body with the urine, there being merely an increased coloration of the renal excretion. If properly administered, and if all other conditions, (such as respiration, etc.) are attended to, anæmia will surely decrease and disappear, it is maintained. The author states that he has employed hæmogallol with uniformly good results in the anæmia of chronic diseases. He prefers giv-

ing it half an hour before meals, in combination with sugar or chocolate, faintly flavored with vanilla and then compressed into tablets or pastilles, containing each 0.5 Gm. of hæmogallol. One of these pastilles at a time is said to be an average dose for an adult, although three to four times as many can be taken three times a day; half to one pastille is the average dose for a child.—Merck's Mark. Rep., 1895, 92.

Hexamethylenetetramine, a Uratolytic. — Hexamethylenetetramine, $C_6H_{12}N_4$, is obtained, according to Nicolaier (Nouv. Rem., xi, 183), by passing a current of dry ammonia gas over warm trioxymethylene (paraformaldehyde). It crystallizes from alcohol in rhomboidal, neutral crystals, which are readily soluble in water, slightly soluble in alcohol, and almost insoluble in ether. N. has observed that hexamethylenetetramine possesses marked uratolytic (uric-acid solvent) properties, while being non-toxic. It can be given in doses of 6 Gm. in aqueous solution, without fear of producing unpleasant secondary effects, it is stated. During its administration the urine remains acid to test-paper, diuresis is increased, and precipitates of urates and of uric acid crystals cease to be produced.

Definite clinical data are yet wanting.

Ichthyol Incompatibles.—The Chemist and Druggist was recently asked for information concerning the action of ichthyol on syrup of iodide of iron. One dram of ichthyol had been ordered in combination with 3 ounces of syrup of iodide of iron, and it was asked if sulpho-ichthyolate of iron is formed in the mixture. The matter was referred to the Ichthyol Gesellschaft Cordes, whose chemist states that, assuming by reaction of ichthyol ammonium with ferrous iodide, ammonium iodide and sulpho-ichthyolate of iron are formed, as the sulpho-ichthyolate of iron is insoluble in water it can be easily prepared by precipitation from ichthyol solutions with any soluble ferrous salt and washing the precipitate with water. By addition of ferric salts to ichthyol solutions, precipitates containing iron compounds of ichthyol are also formed, while at the same time partial oxidation of ichthyol is brought about by the ferric oxide.—Amer. Drug. and Pharm. Rec., 1895, 364.

Ingestol is the name given a remedy which is recommended in acute and chronic complaints of the stomach and intestines, and in sea-sickness. It is a slightly opalescent, light citron-yellow aqueous solution, which is said to contain the sulphates of magnesium, sodium and potassium, sodium chloride, alcohol, ether and iron.—Pharm. Centralh., 1894, 533.

Iodogene is said (L'Union Pharm., xxxvi, 105) to be a mixture of powdered charcoal and potassium iodate, or some other oxygen compound of iodine molded into cones or pastilles. By its combustion this mixture liberates free iodine, which would be useful in fumigating and disinfecting the sick room, etc.

Kaputine consists of acetanilid (anti-febrin) colored, says the British Medical Journal, and continues: It is an article which ought not to be

used by persons unacquainted with its properties and the probable effects it may produce. Like several other of the new synthetic remedies, it should be added to the poison schedule, and its sale placed under proper regulation in the hands of competent persons. It appears highly improper and dangerous that such an article should be puffed and supplied as a quack nostrum without any label indicative of its nature, to warn persons who might be injuriously affected by its administration.—Amer. Drug. and Pharm. Rec., 1895, 75.

Lactophenin has the composition $C_6H_4(OC_2H_5)NH.OC.CH(OH)CH_3$. It is somewhat more soluble than phenacetin. It consists of colorless, odorless, small slightly bitter crystals melting at 117.5° to 118° C.; soluble in 50 parts of water at 15° C. and in 55 parts of boiling water and in 8.5 parts of alcohol at 15° C. The solution is neutral to litmus paper. It is difficultly soluble in ether or petroleum ether. Boil 0.1 gm. of lactophenin with 1 C.c. of hydrochloric acid for a minute, and a yellow color develops; dilute the solution with 10 C.c. of water and filter after cooling, and the solution will turn ruby red on the addition of three drops of chromic acid solution.—Pharm. Centralh, 1894, 358.

Lichenin, $C_{12}H_{20}O_{10}$, is the starch contained in Iceland moss (Cetraria islandica). It is a yellowish-white powder, which swells in cold water, and completely dissolves in hot water after eight hours' digestion. This solution is precipitated by alcohol, and is not colored blue by the addition of iodine.—Merck's Rep., 1894, 75.

Liquor Anthracis is the title given a new preparation of tar resembling the liquor carbonis detergens of English pharmacy. This German preparation is in two forms, a simple and a compound. According to Fischel the process consists in bringing coal tar into solution by a peculiar process, and adding sulphur, resorcin, salicylic acid, to make the compound liquor. The simple liquid is merely a solution of tar. The preparation is a thin liquid which can be spread with a camel's hair pencil.—Pharm. Centralh., 1894, 533.

Lignosulfine.—The product formed during the manufacture of sulphocellulose receives this name. It contains free and combined H_2SO_4 and certain volatile products of the wood. It is recommended as a disinfectant.—Pharm. Centralh., 1894, 429.

Lithium Salicylate.—A mixture of 37 parts of lithium carbonate and 138 parts of salicylic acid is warmed together with a little diluted alcohol, until the reaction is over; the resulting product should have a slight acid reaction to litmus; this is then evaporated to dryness.—Ibid., 1895, 134.

Loretin in Skin Diseases.—In certain industries, in which extreme and varying temperatures, and excessive dampness or dryness, have caused troublesome skin irritation, Loretin is said (Pharm. Rund., 1894, 191) to have proved itself a very excellent soothing and healing medium. The

chapped or irritated parts of the skin are either bandaged over night with a 5 per cent. loretin gauze, or, preferably, are rubbed with a 5 or 10 per cent. loretin talcum powder. All itching of the skin, it is reported, disappears at once. This treatment has also proved effectual in cases of eczema.

Loretin is a substance containing iodine, one of the numerous products recommended as substitutes for iodoform. It occurs in yellow crystals resembling iodoform, but possesses little or no odor, soluble to but a slight extent in water and alcohol, practically insoluble in ether and in oils. With oily liquids and collodion, it is used in mixture or emulsion for application to sores, wounds, etc. It is also recommended as a dusting powder when mixed with a small proportion of calcined magnesia, for the surface of wounds and insufflating into hollows and cavities.—Reg. Pharm., Nov., 1894.

Lychaol.—An extract of Quillaja saponaria, with its taste masked by appropriate substances, receives this name. It is hardly a medicament, being used chiefly for putting a foam on mineral water beverages—Brit. and Col. Drug., 1894.

Lysidin.—Ladenburg describes a compound obtained in the state of hydrochloride by heating ethylene diamine hydrochloride with sodium acetate. The composition of the free base is $C_4H_8N_2$ and is termed *lysidin*. The aqueous solutions dissolved uric acid, and the application of lysidin in the treatment of diseases arising from the secretion of uric acid is being investigated. Grawitz describes it as a crystalline body of a light red color, readily soluble in water, and possessing a peculiar taste. It is administered in doses from 15 to 80 grains daily, dissolved in carbonic-acid water.—Deutsche med. Wochenschr. 1894, 786.

Lysolum Bohemicum.—Under this name a new preparation of tar has been brought into the market by a firm in Bohemia; it is a dark-brown liquid of agreeable odor, and will mix in any proportion with ordinary or distilled water. The solution is permanently clear, and of a yellow color, which darkens after a time without the liquid becoming turbid. The solution does not affect the hands, instruments, clothes, etc. To disinfect wounds a 1 to 2 per cent. solution is used; for disinfecting instruments a solution of 0.2 per cent. will be found sufficient.—Pharm. Centralh., 1895, 280.

Magnesium Sulphophenate (Magnesium Sulphocarbolate) is described (E. Merck's Bericht, p. 82) as occurring in white needles, which are soluble in water and in alcohol; its formula is $(C_6H_5SO_4)_2Mg$. According to G. Tarozzi (Boll. Chim. farm., 1894, 22; Apoth. Zeit., 1894, 921) magnesium sulphophenate, in doses of 1 to 2 Gm., is serviceable as a laxative and intestinal antiseptic; definite clinical data, however, are yet wanting.

Marrol is the designation given to a new dietetic preparation which has

appeared on the English market. It is said to consist of ox marrow, malt extract and hop extract.—Pharm. Centralh., 1895, 81.

Malleïnum Siccum Secundum, Foth.—This is a remedy for the recognition of glanders, and is, in its preparation and effect, an analagon to tuberculin. Malleïnum siccum is a mixture of poisonous, specifically efficient decomposition products of the glanders bacillus, and is obtained in the shape of powder out of very virulent pure cultures of this bacillus by a complicated method; it is preferable to similar fluid preparations on account of its unlimited stability, *i. e.*, it can be preserved for years without any further precautions, and retains lastingly its full efficacy, whereas the fluid preparations, as a rule, deteriorate after a few weeks, and finally lose their effect altogether. Malleïnum siccum has, therefore, quite replaced all former fluid preparations of Malleïne.

The preparation which is made by Foth forms a weak, yellowish white, voluminous powder, soluble in cold water, very readily and clearly and without precipitate. In veterinary surgery it is used chiefly for the diagnosis of glanders. For this purpose the requisite quantity of Malleïne, which is $\frac{2}{3}$–$\frac{5}{6}$ gr. (= 0.04–0.05 Gm.) per dose, is dissolved in 1⅓ fld. drachms = 5 C.c. of sterile distilled cold water, and the solution subcutaneously injected with a sterilized syringe (Pravaz syringe with asbestos piston), in a part of the skin about the middle of the side of the neck, properly shaven and shorn, and well disinfected.—Merck's Report, 1894, 77.

Methylene Lactate.—L. Henry describes an ethereal salt of a new kind, methylene lactate, obtained by the action of lactic acid upon formic aldehyde. It is a colorless liquid with a strong odor, recalling that of the aldehyde, its density at 2.5° is 1.197, and it boils at 153°–154° under a pressure of 754 Mm. Its vapor density was found to be 3.47, and its empirical formula is $C_4H_6O_3$. The ether is readily congealed into a crystalline mass which melts at about —28°. It is insoluble in water, but when warmed with that liquid decomposes into lactic acid and formic aldehyde. —Comp. rend., cxx, 333.

Melanthin.—W. v. Schulz reports upon the physiological action of the body melanthin, isolated by Greenish from the seeds of Nigella sativa. This substance has been shown by Kobert to resemble the sapotoxin of quillaja bark, and by Schulz to be a member of the homologous series of saponins of the formula $C_nH_{2n-8}O_{10}$. The experiments made showed that melanthin exhibited the typical physiological action of the most poisonous saponins (sapotoxin, cyclamin); the lethal dose for cats was determined to be about 2 Mg. per kilogram. Pharm. Zeitschr. f. Russland, xxxiii., 51.

Migrainine.—This body was originally put forward as a definite citrate of caffeine and antipyrine. According to Ewald, its composition was:

Antipyrine	85
Caffeine	9
Citric acid	6

The Pharm. Weekblad (43, 1894), however, gives the analysis of a sample as:

Antipyrine	89.4
Caffeine	8.2
Citric acid	0.56

The editor of the Russian pharmaceutical journal comments strongly on the substitution of mere mechanical mixtures in the place of what are claimed to be chemical compounds. Hamburg has forbidden the free sale of this body to its pharmacists.—Journal de Pharmacie d'Anvers., Amer. Drug. and Pharm. Rec., 1895, 76.

Mydrine is a white, water-soluble powder, representing a combination of the two mydriatic alkaloids ephedrine and homatropine. According to Groenouw, mydrine, owing to the evanescence of its action, is specially serviceable for diagnostic purposes. While homatropine mydriasis usually disappears only after the lapse of one to two days, and that of atropine frequently continues two or three times as long, mydrine produces mydriasis which lasts but several hours.—Merck's Report, 1894, 79.

Mydrine is used by Groenouw (Deutsch. med. Wochenschr., 1895, 161; Merck's Market Report, 1895, 224) as follows:

Mydrine	1 part.
Distilled Water	10 parts.

One application of two to three drops of this solution begins, on the average, to dilate the pupil within eight and one-half minutes, and reaches its maximum dilating power in one-half hour. The pupil begins to contract usually one hour after the application, and is again normal after four to six hours. At the height of the action of the remedy, the pupil has a diameter, on the average, of 5.6 mm. (9–40 inch), a sufficient enlargement for most purposes. With the use of a 1-per-cent. solution of homatropine, mydriasis begins later than with the use of mydrine, reaching its maximum also later; while the duration is often over twenty-four hours, as against four to six hours with mydrine. A 10-per-cent. solution of ephedrine begins to produce its mydriatic action, and arrives at its maximum, at about the same time as would a mydrine solution, but the latter dilates the pupil from 1 to 2 Mm. ($\frac{1}{25}$ to $\frac{2}{25}$ inch) more than ephedrine. The action of ephedrine is usually over in less than four hours. The points adduced in favor of mydrine, therefore, are: Quick action, considerable power of dilatation, and short duration of total mydriasis.

Iodometric Estimation of β-Naphthol.—W. F. Küster.—The iodometric method of estimating β-naphthol, described by Messinger and Vortmann, only gives accurate results when the concentration of the β-naphthol solution is approximately constant, the amount of iodine fixed undergoing

considerable variation when this is not the case. In order to determine the amount of β-naphthol in solutions containing from 0.1–0.5 Gm. per litre, the author made a large number of determinations with known and varying quantities of β-naphthol, using always 100 C.c. of the solution 0.6 C.c. of 3.6 N soda, and 25 C.c. $\frac{N}{10}$ iodine. The amounts of thiosulphate required for titrating back were plotted into a curve, from which an interpolation table was drawn up, showing the amount of β naphthol corresponding with any volume of thiosulphate solution used, and from this table the amount of β-naphthol in any solution can be determined accurately.—Ber. d. Chem. Ges., 1894, 1905.

Neurodin unquestionably possesses antineuralgic properties, and favorably influences the pains of articular rheumatism, trigeminal neuralgia, migraine, and diffuse headaches of various natures; even the pains of tumor cerebri, tic douloureux, molimina menstrualia, sciatica, and tabes dorsalis are frequently mitigated by neurodin. As with all antineuralgics, occasionally perspiration, sensation of heat, nausea, and dizziness appear as by-effects. Oppenheim recommends neurodin as the first anodyne to be tried in any painful condition, and if no benefit be derived from repeated doses, to replace it by one of its congeners. The most efficacious analgesic dose is from ½ to 2 Gm.—Merck's Mark. Report.

Neurosin is the generic name of a number of French preparations (syrup, granules, etc.), containing calcium glycerinophosphate as their active constituent, and on whose therauptic action the name is based.—Ibid.

Nosophen, an Antiseptic. — Nosophen, or Tetraiodophenolphtalein, $C_6H_4C_2O(C_6H_2I_2OH)_2$, is made by A. Classen and W. Loeb (Wien. klin. Woch., viii, p. 213) by the action of iodine upon solution of phenolphtalein. It is a light-yellow, odorless, tasteless powder, containing 60 per cent. of iodine; it melts with decomposition at about 255° C. Chemically it behaves as a moderately strong acid, which dissolves readily in the alkalies, and is capable, with the aid of heat, of liberating carbonic acid from carbonates, while in the cold it is itself separated from its alkali salts by carbonic acid. Nosophen is insoluble in water and the acids, difficultly soluble in alcohol, more easily soluble in ether and chloroform. Heated with concentrated sulphuric or nitric acid, it is destroyed with the elimination of iodine. It resists the action of diluted acids or alkalies, with which it can be boiled for hours, without suffering any change. Its salts are easily obtained in pure form—such as those of mercury, bismuth, zinc, sodium, etc. Its sodium salt occurs as a blue powder, which is readily soluble in water with a blue color. Its salts with the heavy metals are insoluble. Nosophen, as well as its sodium salt, is said to be entirely non-poisonous. Iodine is not liberated from this compound by the organism; whether it be given internally or subcutaneously, iodine cannot be found in the urine. This remedy seems to find particular application in rhinology on account

of its antiseptic and desiccating properties, insolubility, absence of odor, and the ease with which it can be dusted. Especially after cauterization of hypertrophied mucous membrane of the nasal passage, whether by the action of chromic acid, trichloracetic acid, or the galvano-cautery, Seifert considers it as of great value.—Ibid.

Olivin.—According to the Revista di Chem. Med. e Farmacia, this is a "pure, neutral and tasteless oil, brighter, cheaper and better than olive oil for pharmaceutical and medicinal purposes." It contains "no foreign chemical matters, and improves with age." Nothing is said as to its source or method of preparation.—Nat. Drug., 1895, 47.

Paraldehyde is recommended to be given in diluted syrup or almond mixture. A better method is to mix it with an equal volume of olive oil, and emulsify with powdered acacia, sugar and water, flavoring with oil of gaultheria. J. W. England is disposed to question the statement that paraldehyde is probably the principal therapeutic agent in Spiritus Ætheris Nitrosi, B. P. It may be an important constituent, but surely the ethyl nitrite present is of equal or greater importance. It is known that paraldehyde has absolutely no diaphoretic action on the human economy, and from this fact it is very evident that the diaphoretic action of spirit of nitrous ether must be due to some constituent other than paraldehyde, and this is most probably ethyl nitrite.—Martindale's Extra Pharm., 8th ed.; Amer. Jour. Pharm., 1895, 330.

Parabromthymol.—This new compound Plancher prepares by dissolving 20 parts of thymol in 50 parts of glacial acetic acid, cooling the hot liquid by immersing the vessel in cold water, and then adding, drop by drop, a mixture consisting of 25 parts each of bromine and glacial acetic acid. Now 25 parts of water and 1 part of crystallized bromthymol are added, when the crystalline parabromthymol will instantly be separated. The whole mass is now treated with solution of caustic soda, filtered, and the parabromthymol completely separated by the addition of sulphuric acid. The product will be about 21 parts.—Pacific Drug. and Phys., 1894.

Paracetamidophhenol Ethylcarbonate, an Antipyretic and Analgesic.—This compound is described (Sem. med., xv., 74) as a colorless, tasteless, crystalline powder, slightly soluble in water. According to G. Treupel, paracetamidophenol ethylcarbonate is an antipyretic and analgesic of great power, and also a good hypnotic. Given in the dose of 0.5 Gm. in the fever of phthisis, it reduces the temperature 2 or 3° C. inside of three or four hours; this reduction in temperature being followed by profuse perspiration. The subsequent elevation in temperature is not accompanied by chills or other disagreeable symptoms, it is stated. Treupel reports beneficial results from this remedy in the treatment of headaches, and infra and supra orbital neuralgias survening after certain rhinological operations, or due to affections of the nasal cavities; the dose was 0.5 Gm.

The analgesic action of this medicament manifests itself in from half to one hour after ingestion, and persists during several hours.

Paraform.—According to Aronsohn, when formaldehyde is heated for a sufficient length of time in a watery solution, it passes into a solid, white crystalline polymer, insoluble in water. This is paraform. It is a very strong intestinal antiseptic. For this purpose it is said to be superior to β-naphthol, iodoform, salol, dermatol and benzonaphthol. It has a strong inhibitory action on the propagation of bacilli. One grain of paraform will completely sterilize 200 grams of urine.—Jour. der. Pharm. v. Elsass Lothr., 1894.

Testing Phenacetin.—G. Guasti.—The usual test for the presence of acetanilid in commercial phenacetin consists in heating the suspected sample with soda and alcohol, and then warming with chloroform; if the characteristic odor of the isonitriles is detected, the sample is said to contain acetanilid. The author shows, however, that pure phenacetin gives the isonitrile odor under such circumstances; the test is therefore valueless. The presence of 4 per cent. of acetanilid in phenacetin may be detected by boiling 0.5 Gm. of the sample with 10 C.c. of water, cooling and filtering off the deposited phenacetin; the filtrate is concentrated, boiled with 1 C.c. of concentrated hydrochloric acid, and treated with a little liquid phenol and calcium hypochlorite solution. On adding excess of ammonia, the liquid assumes an indigo blue color if acetanilid is present. The following modification of Hirschsohn's method is sensitive to 0.5 per cent. of acetanilid in phenacetin. 1 Gm. of the sample is boiled with 15 C.c. of water, and the solution cooled and filtered. If acetanilid is present, the filtrate gives a turbidity with bromine water, due to the deposition of parabromacetanilid. — L'Orosi, 1894, 111; Jour. Chim. Soc., 1894, 432. (See also Selmi, 1894, 96.)

Phenatol has been found to be a mixture of antifebrin, sodium bicarbonate, carbonate, sulphate and chloride, and caffeine succinate.—Brit. and Col. Drug., 1894.

Sublimophenol.—This body is a mixture of mercuric perchloride and carbolate, obtained by mixing certain proportions of potassium phenol and mercuric chloride. The reaction is

$$2(C_6H_5)OK + HgCl_2 = (C_6H_5)O_2Hg + 2KCl.$$

As the mercuric chloride is in excess, it is not all decomposed. The precipitate formed is at first red, then turns yellow, and finally white, and is obtained in crystals from boiling alcohol. They melt at 210 C.—Jour. de Pharm d'Anvers, 1894.

Piperazine.—J. Gordon (Brit. Med. Jour., June 16, 1894) summarizes his results as follows:

1. Piperazine is not wholly oxidized in the body, and may be detected in the urine of those to whom it is exhibited.

2. Piperazine in solution of 1 per cent. in normal urine, when kept in contact at a temperature of 39° C. for a given time, has the property of dissolving to a great extent a fragment of a uric acid calculus.

3. That the stronger the solution of piperazine in urine (up to 7.5 per cent.) the earlier did the solvent action begin, and the more rapid the completion.

4. That, notwithstanding this, with the stronger solutions of piperazine in urine, the rate of solubility was not so markedly rapid over the weaker solution as might be expected.

5. *That the solvent action of piperazine in similar circumstances was greater than any other of the substances that were employed*, viz., borax, lithium citrate, sodium carbonate and potassium citrate.

6. That piperazine, in weak and strong solutions in urine, converted the undissolved portion of the calculus into a soft granular or pulpy condition.

7. That neither borax, lithium citrate, sodium carbonate, nor potassium citrate in similar circumstances rendered the fragments of calculus soft or pulpy.

The report is made up in part of comparative tables of experiments, and these with the elucidating text form a complete and conclusive argument in favor of piperazine as an invaluable therapeutic agent in uric acid diathesis.—Ibid., 17.

Propylaminum verum anhydricum.—$CH_3—CH_2—CH_2.NH_2$. A primary organic base, representing a fluid boiling at 49—50° C. Propylamine has a strong smell of ammonia, and shows an alkaline reaction; in water it is readily soluble.

Weiss (Allg. Wien. med. Ztg., 1894, No. 42) lately applied propylamine, according to the proceeding of Pürkhauer and N. Weiss (Bayr. ärztl. Intelligenzbl. 1878 and Wien. med. Blätter 1879) in 5 cases of chorea, and effected thereby speedy diminution of the choretic movements, the attacks of convulsion and excitement. Small doses always remain without results, and one must therefore resort to larger quantities of ½–1 dram, which must be increased to 1½–2½ drams daily, in severe cases. These doses are the less open to objection, as the remedy agrees well with children, and has no disagreeable secondary effects.—Merck's Rep., 1894, 84.

Potassium and Aluminum Salicylate is produced, according to J. Athenstaedt (Pharm. Zeit. xl., 138), when potassium acetate and aluminum salicylate are heated together. The compound is soluble in water; on cooling its filtered aqueous solution it separates from it in the form of crystals. Potassium and aluminum salicylate contains a large proportion of aluminum and of salicylic acid; and is, therefore, likely to be of value therapeutically. Clinical data are as yet wanting.

Potassium Sulphophenate (Potassium Sulphocarbolate), $KSO_3C_6H_4OH-H_2O$, occurs as white, shining crystals, readily soluble in water. It pos-

sesses antiseptic properties, but has thus far not been employed clinically; it is probably analogous, in therapeutic application, to sodium sulphophenate.—Merck's Mark. Rep., 1894.

Quionin.—According to H. Endemann and L. Saarbach, this product consists of 90 per cent. of the lesser alkaloids of cinchona, principally cinchonidine, and coated with a resinous product, probably copal. The latter product is slightly soluble in ether, more in ether, and in turpentine quickly and completely.—Pharm. Rund., 1895, 134.

Quinoline Rhodanate, a new Antiseptic.—Induced to experiment with sulpho-cyanhydric (rhodanhydric) acid, from the presence of that body in the saliva, which has itself certain antiseptic properties, Edinger has combined this acid with quinoline, producing pyridine-methyl-rhodanate. Solutions of this body, according to the author, in Semaine Medicale, have very energetic bactericidal properties, the specific microbes of cholera and diphtheria speedily succumbing to its influence. The solution is neither odorous nor caustic. A 1 per cent. solution has also been employed as an injection in gonorrhœa.—Amer. Drug. and Pharm. Rec., 1895, 272.

Rhinosclerin is the name given by Pawlowsky (Pharm. Ztsch. f. Russl.; 1894, 391) to an extract prepared (like tuberculin) from pure cultures of the rhinoscleroma bacilli. It is said to be beneficial in rhinoscleroma (a chronic infectious inflammation of the nose, in the form of induration and atrophy of the normal tissue-elements.) The first injections of the hydroglycerinic extract of the agar-cultures in a patient suffering from rhinoscleroma had an effect on the organism greatly resembling that produced by Koch's tuberculin, though much milder.

Valuation of Commercial Saccharin.—The sweetening value of saccharin depends upon the percentage of ortho-benzoic sulphinid present in the compound. When pure, that is free from side products, it is 500 times as sweet as cane sugar. For the valuation of this compound, which is open to adulteration as well as impurities present, Crato recommends the process of Hefelmann, which consists in converting the o-benzoic sulphinid, by boiling with 71 per cent. sulphuric acid, into acid o-sulphobenzoate of ammonia. This when heated with magnesia yields ammonia, which is collected in $\frac{N}{10}$ sulphuric acid, the amount absorbed being determined by titrating back with decinormal alkali. The per cent. of nitrogen thus found when multiplied with 13.04 gives the percentage value of the compound, that is the actual amount of the sweet principle present. The process is as follows: Into a test tube of 20 mm. diameter, place 0.5 Gm. of the sample to be tested, adding 6 C.c. of 71 per cent. sulphuric acid; heat for three hours, shaking frequently. Then after allowing the mixture to stand over night, it is mixed with water and the ammonia determined after the method of Kjeldahl, magnesia being employed for the liberation of the ammonia, which is collected in $\frac{N}{10}$ sulphuric acid. The author as-

sayed the saccharin produced by the three principal continental manufacturers, with the following results:

Gilliard, Munnet and Cartier, of Lyon	98.582	per cent. Saccharin.
Von Hayden successors	94.022	" "
Fahlberg, List & Co	89.985	" "

—Pharm. Centralh., 1895, 12. (See Also Ibid., 1894, 725 and 1895, 219).

A New Saccharin Patent.—A new method of preparing saccharin has been patented by the Basler Chemische Fabrik. The process consists in the transformation of thiosalicylic acid into thiosalicyl chloride, and this into the corresponding acid amide. This latter body is then oxidized by means of potassium permanganate, or other oxidizing agents. The details are as follows:—21 kilos of PCl_5 and 15.3 kilos of thiosalicylic acid are mixed quite dry. The resulting body is a fluid, and HCl is given off. After getting rid of the HCl and $POCl_3$, the thiosalicylic chloride is crystallized and suspended in water, heated, and treated with potassium permanganate. The saccharin is separated with great ease. — Moniteur Scientifique; Brit. and Col. Drug., 1894, 511.

Salactol, an Antidiphtheritic.—Walle (Apoth. Ztg., 1894, 876) describes salactol (not to be confounded with "salacetol") as a combination of the salicylate and lactate of sodium. A 1 per cent. solution in hydrogen peroxide is said to be a means of promptly arresting the growth of diphtheritic membranes, and causing their disintegration. The author states that he has not had a single fatal issue in a large number of cases of diphtheria treated with this salactol solution; no internal medication was employed, except in cases of persistent fever. The salactol solution was applied every four hours by means of a brush. Inhalations of the solution were also used in some cases.—Merck's Report, Jan., 1895.

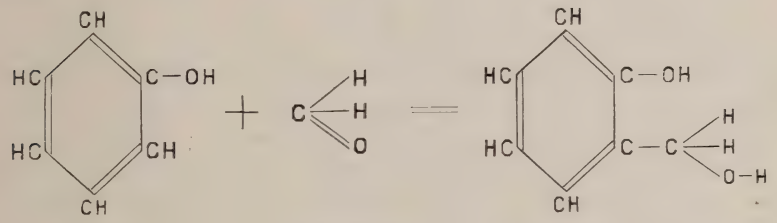
Salacetol, Salautol and Salantol.—According to the Pharm. Centralh., 1895, 101, salacetol has twice made a tour of the earth, first under its true name as salacetol, next through a so-called typographical error, which was in reality an error in proof-reading, as "salautol," and now through still another error it has been started on its third journey around the world as "salantol."

Salifebrin (Salicylanilid) is a new antipyretic prepared by heating together acetanilid and salicylic acid in molecular proportions (Pharm. Post, 1894, 497). It forms a white, permanent powder, insoluble in water, but freely soluble in alcohol; it colors blue litmus-paper red.—Therapeutic data are yet wanting.

Saligenin.—Through the action of acids and ferments (emulsin, saliva, etc.) salicin is split up into saligenin and glucose. This same reaction takes place in the human organism, when salicin is taken internally; yielding, however, only 43 per cent. of saligenin. A dose of 12 Gm. of salicin

corresponds to about 5.2 Gm. saligenin. It has been proposed therefore to administer saligenin instead of salicin in the treatment of malaria, rheumatism, typhus fever, etc., being particularly adapted for dyspeptics.

Von Heyden has succeeded in preparing this synthetically through the condensation of phenol with formaldelyde, as the following equation will illustrate :



Phenol. Formaldehyde. Saligenin.

Such compounds as the cresols, thymol, guaiacol, eugenol, etc., yield analogous condensation products with formaldehyde.

Saligenin crystallizes in colorless scales or needles (M. P., 86°) ; soluble in alcohol and water. Very feeble bitter taste. — Münch. Med. Wochenschr., 1894, 619.

Salithymol.—This body is the salicylic ester of thymol, of the constitution $C_6H_3(CH_3)(C_3H_7).O.OC.C_6H_4.OH$. The body is prepared by acting on equimolecular quantities of the acid and the phenol as sodium salts, with phosphorus trichloride at 130° ; after washing the product with water it is crystallized from alcohol. Salithymol forms a white crystalline powder with a weak sugary taste, slightly soluble in water, easily so in alcohol and ether.—Pharm. Post, 1895, 77.

Tribromsalol, an Intestinal Antiseptic.—Hueppe (Pharm. Centralh., xxxv, 701) divides the intestinal antiseptics into two groups : such as are soluble only in alkaline liquids (as tribromphenol), and such as are first fractionated by the intestinal liquids, before dissolving and exerting their action (as salol).

Tribromsalol—$C_6H_4{<}^{OH}_{COO.C_6H_2Br_3}$— belongs to both groups. It is dissociated by feeble alkalies (as 0.25 per cent. soda solution), even without the co-operation of the pancreatic juice. In passing through the human body it is decomposed chiefly into tribromphenol and salicylic acid. It is relatively innoccuous ; a rabbit weighing 2 kilos bore 15 Gms. perfectly well. Therapeutic data are wanting.

The Detection of Saloptene.—Goldmann recommends the following process : If .1 Gm. is boiled with a 2 per cent. soda solution the mixture at once becomes blue. Heating for a short time causes the color to become yellowish red, and on cooling it returns to an azure blue.—Brit. and Col. Drug., 1894, 34.

Salubrine is a patented remedy from Switzerland. Its composition appears to be: Acetic acid, 2 per cent.; acetic ether, 25 per cent.; alcohol, 50 per cent.; water, 23 per cent. It possesses a strong antiseptic and hæmostatic action, and is of use in the dressing of wounds and bruises, etc.—Ibid.

Silver Fluoride, AgFl, is described as a brown to blackish-brown, glossy, very hygroscopic mass, very easily soluble in water; the aqueous solution is usually not quite clear. Lazzaro found it to be similar, in its general toxic action, to the alkaline fluorine compounds; its virulence is in direct relation to the amount of fluorine contained in it; and in caustic effect it is equivalent to silver nitrate. Silver fluoride possesses antiseptic action. Even quite small doses, while harmless to the human organism, are deadly to the anthrax bacillus. Lazzaro, therefore, proposes its application in anthrax-infection.—Merck's Bericht, 1894.

Sodium Cinnamate is described (E. Merck's Bericht ueber das Jahr, 1894, p. 25) as a white, crystalline powder, of the formula $C_6H_5CH:CHCO_2Na$ and soluble in water. A few years ago A. Landerer recommended the injections of cinnamic acid in internal as well as in surgical tuberculosis. He then proposed the use of a 5 per cent. emulsion of the acid, but recently he suggested replacing this emulsion by a 5 per cent. aqueous solution of sodium cinnamate, the dose of which is practically the same as—or somewhat larger than—that of the emulsion, and its application may be resorted to more frequently (as often as thrice weekly). The solutions are to be sterilized for at least ten minutes, in the water-bath, before use. In internal tuberculosis (pulmonary and otherwise) the solution is injected intravenously; in surgical tuberculosis, into the fungous growths, the articulations, and, by way of change, into the gluteal muscles.

Spasmotoxine, or sphacelotoxine, is a substance extracted from ergot, whose chief action is to produce muscular contraction of the small arteries, and an action on the uterus similar to that of ergot itself. It has been isolated by Jacoby. Its preparation is based upon its solubility in ether and its insolubility in petroleum ether. The ergot is first extracted with ether, and the compound precipitated by means of petroleum ether and then purified. It forms an amorphous yellow powder, insoluble in water or dilute acids, but very soluble in alcohol, acetic ether and benzol. It forms salts with alkalies, and is obtained in the crystalline state by means of benzol. Its formula appears to be $C_{20}H_{21}O_9$. The ordinary dose is from ½ to 1 grain.—Pharm. Centralh., 1894, 535.

Sublimo-phenol.—This is a name given to a phenolated mercuric chloride, or rather a chloro-phenolate of mercury, obtained by Desesquelle in slightly warming together an aqueous solution including one molecule of potassium phenolate, and a similar solution containing a molecule of bichloride of mercury. When the two solutions are brought together under a gentle heat, a precipitate is thrown down, which, on first forming,

is of a brick-red color, which soon passes to yellow, and ultimately becomes white. The product collected and washed is treated with boiling alcohol of 95°, and on cooling off the liquor, the sublimo-phenol is deposited in colorless crystals. These crystals melt and decompose at about 210°C. They are exceedingly soluble in fused phenol, and also in boiling aqueous or alcoholic solutions of phenol. Used in antiseptic surgery.—Nat. Drug., 1894, 356.

Sulphaminol, an Antiseptic.—Sulphaminol was introduced some four years ago, but, until recently, was chiefly employed against the rotten-brood of bees, and, to a certain extent, in naso-pharyngeal affections. Now, De Lantsheere reports favorably on the use of it as a dusting-powder in surgical cases—ulcers, wounds, burns, etc. Sulphaminol acts as an antiseptic and siccative, promptly suppresses suppuration, deterges and deodorizes the wounds; ulcers cicatrize under a dry crust of sulphaminol, without irritation of the adjoining tissues. In view of the latter property and of its odorlessness, sulphaminol appears to be preferable to iodoform. —Merck's Report, 1894, 88.

Sulphanilic Acid and Sodium Sulphanilate in Coryza.—Sulphanilic acid has previously been recommended in iodism, as it converts the nitrites formed in the saliva and nasal mucus into indifferent di-azo bodies. Valentin recommends this remedy further as an excellent means for removing certain symptoms of acute catarrh. The inflammation and swelling of the nostrils and the profuse discharge caused by acute coryza, are all greatly ameliorated, or will even cease altogether in a few hours through the use of sulphanilic acid. It is, however, less effective in acute laryngitis and in otitis media; generally in the latter case it only relieves the pain. The influence effected on catarrhic symptoms is not lasting, so that doses of 2 to 4 Gm. must be repeated every 24 to 48 hours. The remedy is best given according to the following formula:

℞ Acidi sulfanilici cryst..... 10 parts.
Aquæ destillatæ..... 200 "
Natrii bicarbonici..... 8½ "
D.—Two to three tablespoonsfuls twice daily, or else give simply a solution of the salt.

℞ Natrii sulfanilici puriss..... 14 parts.
Solve in—
Aqua fœniculi..... 200 "
D.—Three tablespoonfuls to be taken twice every day.

—Jour. d. Pharm., f. Els. Lothr., 1895, 154.

Action of Sulphonal and Trional.—Schaumann (Therap. Monats., August, 1894) has investigated the action of these agents on metabolism. Morphine considerably influences metabolism and the nutrition of the patient, and the evil effects of its long continued use are in no small meas-

ure to be attributed to these facts. Chloral hydrate has much the same action on the tissues. Similar investigations made with sulphonal and trional have hitherto yielded inconclusive results. The author has made experiments upon himself. He found that trional had the more marked hypnotic effect. After putting himself on a given diet and producing nitrogenous equilibrium, he was able to show that neither trional nor sulphonal, even in large doses, has any action on metabolism. Hence the superiority of these agents over chloral hydrate, especially when it is considered that the latter also acts on the heart.

Tannigenum is the name given to acetyl tannin, which has been recommended as a remedy in diarrhœa. It appears in the form of a yellowish gray, odorless and tasteless powder. It is not appreciably soluble in water or in dilute acids, but is easily soluble in alkalies, and thus passes through the stomach and does not exercise its astringent action until the bowels have been reached. The dose given so far is 0.2 to 0.5 Gm. three times a day, although daily doses amounting to 3 or 4 Gm. have been given without producing any disagreeable results.—H. Meyer, in Bull. Com., viii, 373.

Thioform.—By the action of monochloride of sulphur on salicylic acid at 150° C. hydrochloric acid is evolved and two isomeric dithiosalicylic acids are formed:

$$\begin{matrix} S\text{—}Cl. \\ | \\ S\text{—}Cl. \end{matrix} \quad + \quad \begin{matrix} C_6H_4(OH)COOH \\ \\ C_6H_4(OH)COOH \end{matrix} \quad = \quad 2HCl + \quad \begin{matrix} S\text{—}C_6H_3(OH)COOH \\ | \\ S\text{—}C_6H_3(OH)COOH \end{matrix}$$

In one, the hydroxyl group is found in the ortho-position to the sulphur, while in the other it is in the para-position. The sodium salts of this are known as Dithion I. and II., respectively. Both compounds possess similar therapeutic properties (antiseptic). A mixture of both salts is sold under the name Dithion. If an aqueous solution of Dithion, which has been rendered alkaline by sodium hydrate, is brought into reaction with a solution of bismuth nitrate, a basic bismuth compound is precipitated, which, like most of such organic bismuth compounds, is rendered more basic by washing.

This compound has probably the following composition:

$$\begin{matrix} S\text{—}C_6H_3(OH)COO \\ | \\ S\text{—}C_6H_2(OH)COO \end{matrix} \!\!> BiO\text{—}Bi \!\!< \begin{matrix} O\text{—}BiO \\ \\ O\text{—}BiO \end{matrix} + 2H_2O$$

and is represented by the so-called thioform of Messrs. Speyer & Gruno, of Frankfurt a. M.—Thoms Apoth. Ztg., 1894, 760.

Thioform.—This is entirely non-poisonous, as has been proven by large doses administered. In treatment of profuse suppuration it has shown itself superior to iodoform and dermatol. In treatment of moist eczemas it is applied in the form of a ten per cent. ointment.—Alumni Journal, 1894.

Traumalol (Iodocresol).—This is proposed as a substitute for iodoform. It is prepared by adding a solution of iodine in potassium iodide to an emulsion of creosol in water. Traumalol forms an insoluble inodorous reddish-colored powder.—Ibid.

Traumaticin (which is a 10 per cent. solution of gutta percha in chloroform) has been pretty extensively used in combination with various medicaments for application to the skin, and Jullien has proposed the combination indicated in the title as a convenient and effective method of mercurial treatment in certain diseases. For this purpose 25 per cent. of calomel is added to the traumaticin, and the mixture applied with a brush. The calomel is quickly absorbed, as is seen by the urine and by the production of gingivitis in certain cases.—Rép. de Pharm., 1894, 449.

Thiotone and Una are two proprietary articles used for toning silver-chloride gelatin prints. According to Valenta (Pharm. Centralh., xxxvi, 262), thiotone is a solution of ammonium sulphide; and since its toning effects are due to the formation of silver sulphide, this solution is considered as injurious to the prints. Una is said to contain lead tartrate and free citric acid, with a trace of acetic acid; it is intended to be used with sodium thiosulphate (hyposulphite). Its action is also due to the formation of silver sulphide, and, according to Valenta, is therefore not to be recommended.

Thermodin as an Antithermic.—Schmitt (Sem. Med., 1894, 219) reports to have proved, by experimental and clinical researches, that thermodin is perfectly innocuous; it produces no gastric disturbance, cyanosis, or collapse, but, sometimes, sweats, or chills, which are, however, very slight. After a dose of 60 Cgm. the abatement of the temperature hardly exceeds 0.9° C. (1.6° F.); after doses of 1 Gm. the averagere mission is 1.4° C. These effects, which, the author states, are obtained in influenza, tuberculosis, etc., are slowly produced, but are durable.

Thyroidinum Siccatum is the name which Merck has given to a preparation of the thyroid gland in a dry form. The preparation appears as a coarse, grayish-yellow powder of a characteristic odor. 0.6 Gm. of this powder is said to represent a whole large fresh thyroid gland. The dose is given as from 0.1 to 0.3 Gm.—Merck's Report, 1894, 96.

Tests for Trional.—Pure trional forms colorless, odorless crystals in thin lamellæ, soluble in about 300 parts of cold water, easily soluble in ether and alcohol, and melting at 76.5° C. Mixed with charcoal and heated carefully, it gives off the odor of mercaptan. The aqueous solution should give no odor on boiling. After cooling and filtering it should give no turbidity with barium nitrate or silver nitrate. It should not decolorize solution of potassium permanganate.—Pharm. Post., Amer. Drug. and Pharm. Rec., 1895, 338.

Tussol.—The preparation introduced under this name as a remedy for

coughs is a saline copound of antipyrine and mandelic acid ($C_8H_8O_3$). It is stated to be very much more effectual than antipyrine. For children under one year the dose is from one-third of a grain to a grain and a half two or three times a day; for children over four years, seven grains several times in the day.—Pharm. Centralh., 1894, 532.

Tussol is the name applied to antipyrine amygdalate, which Rehn (Pharm. Post., 1894, xxvii, p. 351) has employed in a number of cases of pertussis. His experience results, briefly, in the following conclusions: (1) Tussol favorably influences the complex of symptoms in whooping-cough—rapidly diminishing the frequency of attacks and mitigating their intensity; (2) its action decidedly exceeds that of simple antipyrine. No untoward by-effects have been noticed. Tussol is soluble in water, and is best administered in aqueous solution, flavored with raspberry syrup. The smallest efficacious *dose* for children under 1 year is stated as being 5 to 10 Cgm. 2–3 times daily; 1 to 2 years, 10 Cgm. 3 times daily; 2–4 years, 25 to 40 Cgms. 3–4 times a day; for older children, 40 Cgm. 4 or more times daily.

Vasogen.—G. Kottmeyer has examined Dahmen's vasogen, and finds that when heated on a water-bath it loses ammonia gas, and its power of emulsifying with water is simultaneously destroyed, but the latter is restored by passing ammonia gas into the oil after heating. Oleic acid was also found to be present to the extent of about 20 per cent., and a mixture of vaselin oil with 25 per cent. of crude oleic acid and 5 per cent. of absolute alcohol yielded, when saturated with ammonia gas, the counterpart of vasogen. Vasogen spiss. appeared to be a similar mixture of oleic acid with solid vaselin or petroleum jelly, saturated with ammonia. Creosote vasogen can therefore be prepared at about one-fifth of the price of the factory-made preparation, as follows: Pure creosote, 20; white vaselin oil, 60; common oleic acid, 20–25; ammonia gas, q. s.—Pharm. Post., xxviii., 68.

Zinc Subgallate is described as an odorless, non-hygroscopic, non-toxic, non-irritant, greenish-gray, neutral powder, insoluble in all ordinary solvents, unaffected by light, and containing 44 per cent. of zinc oxide and 56 per cent. of gallic acid. This new remedy is used both internally and externally. Internally it has been recommended in doses of ½ to 4 grains (3 to 25 Ctg.) in fermentative disorders of the intestines, and in night-sweats. Externally it has been used in eczema, fresh and septic wounds, otorrhœa, gonorrhœa, and hemorrhoids. It is applied pure or diluted with indifferent powders or ointments. As an injection in gonorrhœa it is suspended in water and mucilage, in the proportion of 1 in 16.—Merck's Mark. Rep., 1895, 134.

Zymoidin.—This is an insufflating powder used for gonorrhœa. It is said to be a mixture of no less than 17 antiseptic substances.—Südd. Apoth. Zeitung; Brit. and Col. Drug., 1895, 135.

GENERAL.

Condition of Pharmacy in America.—G. M. Beringer calls attention to the problems affecting American Pharmacy, and says that whatever the improvements or reforms that may be accomplished, they will not be the results of either legislation or combination, but must emanate from pharmacy itself. We must have better material, to commence with—young men whose idea of pharmaceutical education is something more than just sufficient to obtain a degree. We must have all our pharmaceutical colleges aiming to impart the most thorough education, to graduate the most perfect students. Their aim must be higher education, not larger classes, and their diplomas must be conferred only on those possessing a knowledge and skill befitting a professional standing. We must have pharmaceutical journals that sustain and advance the scientific and professional side of pharmacy, and are unwilling to sell their honor and influence for advertising patronage. Above all, the public must be educated to appreciate competent, thoroughly educated pharmacists. The present condition must be the foundation for future advance in American pharmacy.—Pharm. Jour. Trans., 1895, 602.

Pharmacy in China.—In an interesting article on the pharmacy in China, it is recorded that most of the Chinese prescriptions are put on paper with a view of calculating the cost of the ingredients, no notice whatever being taken of the proportion or effect of the drugs. It is recorded, however, that great care is exercised by the native druggists in collecting and preparing plants and other natural objects. Buds, flowers, roots and leaves of the same plant are supposed to produce totally different results. The various parts of the plant have, according to the Chinese method, to be collected during certain periods, and at a certain stage of development, so that collecting goes on all the year round.

The careful manner in which the Chinese preserve their plants or herbs is evident from the fact that the dried flowers and leaves retain their natural colors in a remarkable degree. The reason of this exactitude may be due to the Chinese belief that the precise effect of various substances is mainly influenced by the manner of their application. For instance, a doctor would usually order medicine to be given either in powder or in pills, or dissolved, because he feels convinced that the effect produced would vary according to the state in which the medicine is exhibited.—Amer. Drug. and Pharm. Rec., 1894, 373; from Pharm. Jour. Trans. and Apoth. Zeit., 1894.

Pharmacy in Denmark.—A. Wunsch states that there are 169 pharmacists in Denmark, Iceland and the adjacent islands, *i. e.*, about 1 per 13,577 of the population. Copenhagen, the capital, with a population of 312,859, has but 21 pharmacies, or 1 per 14,898 individuals. The licenses to carry on business are either "real" or personal." The former, none of

which have been granted since 1842, number 89, and are identified with certain pharmacies which may be sold and bought with the licenses attached. The purchaser must in any case be 25 years old, and possess a satisfactory diploma. Pharmacists in Copenhagen must have their diplomas endorsed "very good," whilst those who simply have the mark "good" may practice pharmacy anywhere else throughout the country, and those whose diplomas are marked "medium" only must be examined anew before they can practice. The course of study insisted upon extends over six years, three years as a pupil in a pharmacy, one as assistant, and eighteen months at the school of pharmacy.—Jour. Pharm. Chim., 1895, 233.

The French Pharmacy Law.—The Parlimentary Commission charged with examining the draft of the new Pharmacy Act voted by the Senate last December, has just been nominated. Amongst its members is Bourgoin. In addition, there are six doctors, two pharmacists, and one veterinary surgeon. We are unable to give the full text of the Bill as sent from the Senate to the Chamber of Deputies, but, briefly, we may mention that it consists of 31 articles, and that it annuls all previous laws contrary to the present one, including a number of specified Acts from 1748 to 1816. There is, in the future, to be only one diploma, corresponding to the present "Pharmacien de Première Classe," and no foreigner shall practice pharmacy without taking this diploma. Hospital dispensers and pharmaceutical students, whose terms are finished, may be authorized to act as *loca tenentes* for pharmacists without having passed all their examinations. This authorization is limited to three months, but is renewable. Every *pharmacien* must own the shop he carries on, except as allowed by the present law. Only one shop may be kept by a *pharmacien*, and he shall confine himself to the sale of drugs and allied products. He is expected to reside in the neighborhood of his shop. In case of the decease of a *pharmacien*, his widows or executors may carry on the business for a year, with the aid of another *pharmacien* or a student, as provided for in Clause 6 (detailed above), and for two years, if the deceased shall have left a son who is advanced up to a certain stage in his pharmaceutical studies. Stringent regulations are enforced with regard to the sale of serums and viruses. Vaccine lymph is exempted from these. There shall be published, at least once in ten years, a new edition of the Codex, and a Supplement at least every two years (to be in French). The limits of the contents of the Codex are closely defined. Any one, not a qualified pharmacist, who shall practice pharmacy, or be connected with it by co-operation, or association, or company (except in exceptional cases allowed for), shall be liable to a fine of from 500 to 3,000 francs. A simultaneous exercise of the functions of doctor, dentist or midwife with those of pharmacist, is punished by a fine of 100 to 500 francs.—Brit. and Col. Drug., 1894.

Pharmacy in Germany—The Present Position.—Views by Frölich on

the two questions that have concerned the German pharmacists for several years, viz., the "Gewerbefrage" and "Standesvertretung."—Pharm. Jour. Trans., 1894, 151.

Patent Medicines in Germany.—In Germany secret medicines are not at all allowed to exist. Of each remedy the exact composition must be stated, and the compound must not only contain no poisons in the true sense, but even not have the smallest addition of any drug which is considered as powerful, like opium, calomel, cherry laurel water, chloroform and others. And further, the patent medicine must not be advertised in the daily press, and the publishers of newspapers are prosecuted and heavily fined if an advertisement appears which is looked on as referring to a patent medicine.

Besides this, the government and the local police and the health authorities do their best by publicly warning people not to use certain patent or quack remedies, which are then officially denounced as consisting of practically nothing which would do any good in curing or improving certain diseases. Further, it is pointed out that the charge of two-and-six pence, for instance, is far above the true value of the constituents, and that three pence is about a proper equivalent for the would-be benefactor's (namely, the patent medicine manufacturer's) draught.—Brit. and Col. Drug., 1894.

Pharmacy in Illinois.—President Thiele, in his address to the annual meeting of the Illinois Pharmaceutical Association, states that there has been a steady increase in the number of registered pharmacists, as shown below:

Year.	Renewals.	New Registrations.
1890	2,455	224
1891	3,603	300
1892	3,810	319
1893	3,963	346
1894 (part)	4,107	238

The increase in the number of registered assistants is even greater, the year 1893 showing a growth of 17 per cent. over the preceding year; and he foretells increased competition, from the fact that the registered pharmacists are multiplying, comparatively, more rapidly than the general population.

Continuing, the President puts his finger on an undoubted blot—and that a glaring one—in his State pharmaceutical regulations—*i. e.*, the fact that the pharmacy law allows persons to be registered without examination who can show five years' experience. During 1892 and 1893, 503 persons qualified by examination; 162 were granted the same privileges under the clause in question.

Speaking broadly, we think that the sooner the Illinois pharmacists obtain the repeal of the section the better, as it can only lead to the registration of incompetent persons, while further it is unfair to compel exami-

nation in some cases, and not in others. Of course, vested interests must be respected, but all new entrants into the profession should submit to the same regulation.—Ibid., Sept. 14, 1894.

Pharmacy in Mexico.—B. F. G. Egeling (Meyer Bros.' Drug., 1894, 426) says that the law requires a poison closet, or that poisons be kept in bottles distinct from the ordinary glass-ware. (2) No prescription can be dispensed if the ordinary adult maximum dose is exceeded, unless the prescribing physician states over his signature on the prescription itself that he intends the dose in question. An (!) is required behind the dose if the pharmacopœial maximum dose is exceeded; if not, the prescription has to be referred to the Kreis Physicus (county physician) in case the prescribing doctor cannot be found, before the prescription can be dispensed. Another feature is the copybook for prescriptions (Copiador de recetas). All prescriptions are returned to the owner as soon as paid, and only retained as vouchers until paid for. There is in vogue in Monterey a threefold check system for prescriptions. A clockwork changes a stamp which is used to mark prescriptions as soon as they are brought in, so that the time appears on the paper. The prescription being finished, as well as upon its delivery, this stamp is used again, and in case of complaint it can be told to the minute how long the messenger was detained. As soon as a customer brings a prescription he receives a check with a printed number, a second corresponding number is attached to the prescription, or in case of a refill to box or prescription bottle, and a third number to a slip of paper stamped with time and whether waiting, to be sent, or urgent, all this appearing on the time stamp at will. The slip of paper is retained with price mark, etc., as a check for the book-keeper in case the prescription was not charged properly, or of any claim.

No drug store can be opened without previous notice to the Governor of the state and the Mayor of the respective city, so that the prospective Botica may be inspected whether it be in proper condition to open business. No physician has a right to prescribe a private formula. The law does not exclude patent medicines, but requires that a prescription must be written, so that it can be filled at any drug store without prejudice. The superior Board, however, has the right to exclude patent medicines from drug stores, in case they should find them injurious to health, but the writer does not know of one that has ever been treated in that way. On the contrary, there are more patents in original bottles prescribed by physicians than in any other country. These "patents," however, almost all originate from France, as do most of the official preparations also.

Pharmacy in Rome.—H. B. Morgan among other things says that in Rome the pharmacist's stock is partly regulated by law, and in the Pharmacopœia is a list of drugs, the absence of any of which renders the pharmacist liable to a fine of 10 lire (about 7 shillings 6 pence). Those named, however, by no means comprise the whole stock, and the number

and variety of alkaloids and the various synthetical remedies which are kept are large.

The sale and importation of saccharin are forbidden, partly to protect the sugar industry, and partly because the Government has decided its use to be injurious.

The sale of patent medicines and proprietary articles, unless they have the formula printed outside, is forbidden. Makers of some English and American popular nostrums comply with this law by sending them with a special label with the (supposed) recipe on it. But to oblige the English customers, they keep in stock a number of articles of which the makers publish no formula, and though the authorities know of it, they do not interfere, probably out of courtesy to the visitors who want the things, and on whom, to a great extent, the prosperity of the city depends.

As doctors are not allowed to dispense, this all falls to the chemist, and constitutes a large part of his business. Italians nearly always wait for their medicine. The law requires the chemist to retain the prescription, but with the exception of those containing such drugs as ergotin, they never adhere to it.

There is very little counter-prescribing. The certainty of receiving all prescriptions does away with the desire for it, and though the pharmacy is the place people with slight ailments generally visit, and in case of street accidents usually rush to, it is because they expect to find a doctor there.

A very good law provides that if any dispenser detects unusual or poisonous doses he shall demand (not merely ask as a favor) that the prescriber shall declare in writing on the prescription the purpose for which he intends it to be given, and also state that he will be responsible for the result.

The first Italian Pharmacopœia was published in 1892. It is in the native language, the titles being in Italian, with the Latin name below. It contains, besides formulas, various tables and laws relating to the business. Besides those laws already mentioned, a penalty of 100 francs (with suspension of license in case of repetition of offense) may be imposed for keeping bad or weak drugs. Another awards a penalty not exceeding 500 francs or 12 months' imprisonment for supplying medicines not in accordance with the quality and quantity ordered; and the same penalty may be inflicted on a person who sells poisons illegally, or fails to keep certain ones named under lock and key.—Amer. Drug. and Pharm. Rec., 1894, 173.

EDUCATIONAL.

Pharmaceutical Fellowships.—The School of Pharmacy of the University of Wisconsin has endorsed one fellowship for three years and two others of $400 each for two years each.

——— The School of Pharmacy of the University of Michigan has an endorsed Fellowship of two years.

Foreign Students at German Universities.—Fr. Hoffmann (Pharm Runds., 1895, 25 and 49) considers especially the Institutions of Pharmacy in Germany and gives some timely advice regarding the courses of instruction, and the time for entering the Universities. He also gives a schedule of the prescribed studies for students of pharmacy in the several universities. A translation of this article in English will be found in Amer. Drug. and Pharm. Rec., 1895, 240 and 278.

Failure in Passing Examinations.—The Report of the Minnesota State Board of Pharmacy records the astounding erroneous answers of 12 applicants for the State Board Examinations, and then adds:

Many of such candidates appear before the Board and state that they have had from two to four or five years' experience in drug stores; it is pretty evident, however, that the experience was of a very crude sort. There is also a great lack of general education on the part of many of the applicants; too many boys are taken into drug stores as apprentices with scarcely any education whatever, the result is they seldom acquire it afterward and come before the Board four or five years later unable to write a legible hand, spell correctly or write a grammatical sentence, and with little if any knowledge of mathematics or Latin.

This is all wrong, as it is certain to bring chagrin and disappointment to such persons in the future, whether they are successful in passing the Board or not, as Board examinations are not primarily intended to cover these branches. It would be a wise provision of law which required some standard of general education before the apprentice was permitted to begin his work in the drug store or laboratory.—Reprinted in Amer. Drug. and Pharm. Rec., 1894.

Colleges of Pharmacy.—Fr. Hoffmann (Pharm. Runds., 1894, 277) after a review of one of our colleges of pharmacy, concludes with the following reflection on the future of American Colleges of Pharmacy:

Our Colleges of Pharmacy are, for the most part, unfortunately not in a position to fall back on State aid or on liberal endowments, as the universities are. They have in most instances been created, supported and fostered to their present growth very largely by the voluntary and patriotic contributions or investments of individuals or firms financially interested in pharmacy and the drug trade, and hence morally interested in the elevation of American pharmacy (which has been, so far, the basis of the American drug trade also). With the decline of the profits in pharmacy proper in recent years, however, a constantly increasing element of mercantilism has grown up amongst our pharmacists, and is necessarily more and more crowding out the scientific and purely professional aspirations from their minds and efforts. High professional education has in many instances come to be considered a beautiful ornament, but an unprofitable investment. Scientific capital, in the retail drug business, has ceased to bear adequate interest. Without proper opportunities to utilize ideal ac-

quisitions, the demand for the latter must decline; college diplomas will be less and less sought for; and the small fraction of those aspirants for education who still retain, against the force of circumstances, their desire for genuine scientific lore, may suffice to fill the lecture-rooms of the university pharmaceutical departments, but not the spacious halls of the Colleges of Pharmacy. Pharmacy, although professionally losing more and more grouud, may recover the lost domain and authority in another quarter by a proper adaptation of herself to the modern developments in sanitation, industrial chemistry, and other allied pursuits of a more specialized and definitely circumscribed character. By thus adapting herself, she will march on triumphantly over all the breaks occurring in her commercial and technical foundation, and will attain a new development commensurate with the progress of the age, and will hence become capable of carrying her own special schools, properly transformed, but unscathed in their vitality, through this transition period.

College Degrees.—During the past year there has been an epidemic in changing degrees. The most notable change is in the Philadelphia College of Pharmacy conferring the degree of Doctor of Pharmacy on all students who successfully pass the three years of study and possess four years' experience in a drug store; and the degree of Pharmaceutical Chemist on all who are without the necessary experience, but who pass the examinations for the three years of study. The School of Pharmacy of the University of Kansas now gives the degree of Pharmaceutical Chemist instead of Graduate in Pharmacy as heretofore, and relegates the responsibility of vouching for practical experience to the State Board of Pharmacy. The Chicago College of Pharmacy has added the degree of Pharmaceutical Chemist to all students that successfully finish the two years' course of study, but have not had the four years' practical experience required for the degree of Graduate in Pharmacy. All of the Schools of Pharmacy connected with the Universities, no longer require practical experience, but relegate this requirement to the State Boards to look after.

College Graduates.—E. C. Jones (Alumnia Report, Philada., 1895, 7), gives data obtained from college announcements, pharmaceutical journals, and personal correspondence. Where there was a variability in the number of graduates named, the highest number has been taken, and the authority given.

Twenty-five colleges which grant the degree of Graduate in Pharmacy, graduated 951 men. The statement by number for each college is: Albany, 20 (*D. C.*); Atlanta, 3; Brooklyn, 24; Buffalo, 26; California, 30 (this school holds its lectures from April to October, inclusive. The number of graduates given is for 1893—it is assumed that the number for 1894 will be the same); Chicago, 48; Cincinnati, 18; Detroit, 8; Illinois, two consecutive terms) 111; Iowa, 5; Kansas City (Mo.), 16; Kansas University, 17 (*D. C.*); Louisville, 31 (*D. C.*); Maryland, 36; Massachusetts, 23 (*D.*

C.) ; Meharry (Nashville, Tenn.), 12 ; Minnesota University, 6 (*Era*) ; New York, 128 ; Ohio (Columbus), 3 ; Ohio (Ada), Normal University, 79 ; Philadelphia, 183 ; Pittsburg, 22 (*D. C.*) ; Purdue (Lafayette, Ind.), 37 ; Scio, 12 ; St. Louis, 53.

The average of graduates is about forty to each school. Two schools which grant the degree of Doctor in Pharmacy graduated 32 men—the Howard University, 5, and the National School (Washington, D. C.), 27.

Three schools which grant the degree of Pharmaceutical Chemist, graduated 41 men—the Michigan, at Ann Arbor, 23 ; the Vanderbilt, at Nashville, Tenn., 3 ; and the Wisconsin, at Madison, 15 (*Era*).

Out of the total of 30 schools for which results are given, 25 grant the degree of Graduate in Pharmacy. Some confer a special and honorary degree upon those who have rendered eminent service to pharmacy, as does the Philadelphia College of Pharmacy, with its degree of Master in Pharmacy (Ph. M.). The Cleveland School of pharmacy gives no degree, but grants its students certificates which entitle them to enter the second course in other colleges ; the number so given in 1894 was 9.

It will be seen, upon examination of these data, that the total number of men who have received degrees in pharmacy during 1894, is 1,024 ; and the estimate is doubtless too small, as but 30 of the 36 schools of the country have furnished results. This number, large as it may seem, is only a small percentage of those actually engaged in the practice of pharmacy.

Boards of Pharmacy and Diplomas.—In West. Drug., 1895, 40, we find a list of Boards of Pharmacy that accept diplomas of colleges of pharmacy and foreign certificates, as being compiled by one of its contemporaries :

Arkansas	All must undergo the state's examination.
Illinois	" " "
Maine	" " "
Massachusetts	" " "
Michigan	" " "
Minnesota	" " "
Mississippi	" " "
Nebraska	" " "
New York	" " "
New Jersey	" " "
Ohio	" " "
Pennsylvania	" " "
Rhode Island	" " "
Washington	" " "
Wisconsin	" " "
Utah	" " "
West Virginia	Accepts graduates of colleges of pharmacy.
District of Columbia	" " "
Florida	" " "
Iowa	" " "
Missouri	" " "
Oklahoma	" " "

Baltimore.—The city of Baltimore admits persons holding diplomas from recognized colleges of pharmacy, based upon a full four years' apprenticeship as a pharmacist. All other persons wishing to practice must be examined.

California accepts all certificates where four years' experience is required, and attendance at two or more courses of lectures.

Georgia.—This state accepts the certificates of Germany, France, Great Britain, Ireland and Ontario. All others must submit to examination, but are allowed to practice until the regular meeting of the board, provided they hold a certificate.

Idaho.—No state board. Each county decides as to what certificates it will accept.

Kings County, New York, will accept the higher diploma of any teaching school of pharmacy in any country.

Louisiana accepts no pharmacy certificates. Pharmaceutical graduates of foreign universities are, however, recognized.

North Carolina recognizes the Ontario certificate, and would consider any other certificates submitted and decide on their merits.

North Dakota will register persons if the board be satisfied as to their standing and character.

Oregon accepts the English and Irish certificates.

Texas.—There is no state board, but a separate board for each judicial district, and each board determines for itself what certificates will be accepted for registration.

Virginia accepts the certificates of Great Britain and Ireland.

Wyoming.—The pharmacy law is a dead letter.

NOMENCLATURE.

Nomenclature of Official Remedies.—Joseph Ince recommends the systematic adoption of known grammar rules to meet new requirements.—Pharm. Jour. Trans., 1894, 199.

Officinal or Official.—N. Husemann (Pharm. Runds., 1895, 9) regrets the change, and cites the time-honored usage of the word "officinal" as a strong argument against the change. Husemann goes over the ground of the derivation of the two words, and states that the first departure from the general practice of using "officinal" was made in the Real Encyclopœdia.

——— Chas. Rice (Ibid., 10) accepts the ordinary derivation of the two words, and the meanings assigned to them in accordance with their origin. Nor does he deny that it has been customary, up to within a few decades, to apply the English word "officinal" quite generally in the sense of "pharmacopœial." Yet, within the memory of most readers, voices arose in favor of a change, the word "official" being proposed to replace "officinal" in the special sense of "pharmacopœial." It is evident that some cause arose which produced the feeling that such a change was necessary, and the cause is not far to seek. In those countries in which the exercise of pharmacy is under the control of the government, and where the stock of a pharmacist, so far as it is used in physicians' prescriptions, contains comparatively few remedies besides those directed by the Pharmacopœia, the two meanings of the word "officinal," viz: 1, the original one "pertaining to an 'officina;' pertaining to or kept in a drug store," and, 2, the more modern one, "pharmacopœial; authori-

tative," practically cover each other. This is particularly the case in Germany, where the word "officinell," and in France, where "officinal" is in general use in the second sense mentioned above. It is different in this country, where the pharmacist is compelled to carry a large stock of non-pharmacopœial preparations, many of which are prescribed by physicians.

The two meanings of the word "officinal" have two widely differing boundaries. They may be likened to two concentric circles. In the first mentioned sense ("kept in a drug store") the word occupies the area of the larger circle; in the second sense ("pharmacopœial"), usually that of the inner, smaller circle. In some parts of this country the inner circle—to continue the simile—is much smaller in proportion to the outer than in others. In some it may attain an area of perhaps three-fourths or four-fifths of the larger; in others it may even outgrow the former outer circle. Only in rare cases will the peripheries of the two circles coincide. Since the two meanings long ago ceased to cover each other, the necessity arose to use different words to express the two different meanings, and it was, therefore, proposed to employ the closely related word "official" in the sense of "pharmacopœial," and to use the word "officinal" only in the general sense "kept in a drug store," which is, indeed, in accordance with its original meaning and origin. Those who object to the use of "official" in the sense of "pharmacopœial," say that *officialis* means "govermental; pertaining to an office or official, etc."—that it is, therefore, correct to say, for instance, "The official preparations for the reception of the President are completed," but incorrect to say: "He made all the official preparations in his own laboratory." There is, however, no danger of any misunderstanding in these two sentences; indeed, much less danger than would be in many sentences containing the word "officinal."

The judgment of the writer is that the employment of the word "official" in the sense of "pharmacopœial" is justifiable on linguistic grounds, and that it is, moreover, fully justified by the condition of pharmacy in this country, where a clear distinction between "all sorts of medicines," and "pharmacopœial medicines" has become necessary. Of course, the Committee on Revision, which hoped to settle the controversy by an "official" vote, according to which the word "official" was hereafter to be used in place of "officinal," when applied to pharmacopœial preparations or directions (see U. S. Pharm., 1890, p. xxxvi.), did not mean thereby to encroach upon the ordinary meaning of the word, which appears, for instance, on the title page of the Pharmacopœia in the sentence: "Official from January 1, 1894."

PHARMACOPŒIAS.

Pharmacopœias of the World.—Charles Rice gives a complete history of Pharmacy and Pharmacopœias of the world. He gives the methods of making a Pharmacopœia as followed by the Committee of Revision of the

U. S. P. The paper in its entirety is an authoritative, and a reliable presentation of the subject of the Pharmacopœias of the world, what they are, what their authority, what their defects and leading characteristics. The bibliography is especially exhaustive.—See Pharm. Era, 1895, 4 to 103.

The French Pharmacopœia.—The new edition of the French Pharmacopœia, or "Codex Medicamentarius," which has appeared with a supplement of 100 pages, does not in the main differ materially from its predecessor of 1884.

The principal change is the addition of a supplement, which, in a way, was put there to obviate the necessity of completely revising the preceding edition.

Many of the new synthetic remedies are described in the supplement under names indicative of the chemical composition of the substances. The following trade-marked remedies are given the accompanying designations :

Trade name.	Codex name.
Antifebrin	Acetanilide.
Antipyrine	Analgesine.
Aristol	Diiododithymol.
Benzonaphtol	Benzoate de naphtol, beta.
Dermatol	Gallate basique de bismuth.
Exalgine	Methylacetanilide.
Phenacetin	Acet-Phenetidine.
Saccharin	Acide anhydro-ortho-sulfamide-benzoique.
Salipyrine	Salicylate d'Analgesine.
Salol	Salicylate de Phenol.
Sulfonal	Acetone diethyl sulfone.

A new alcoholimetric table has been introduced which gives the specific gravity of mixtures of alcohol and water containing from 0.0 to 100.0 per cent. of absolute alcohol. The granules of aconitine, aconitine nitrate, digitalin, and strophanthin, all crystalline, are to contain 1-10 milligramme each, instead of 1 milligramme, as heretofore. The new crude drugs added are : bark of Euonymus atropurpureus Jacq. and Rhamnus Purshiana DC. ; bark and leaves of Hamamelis virginica L. ; rhizome of Hydrastis canadensis L. ; seeds of Sterculia acuminata beans (kola nut) and of Strophanthus Kombe Oliver ; and the entire plant of Surothamnus scoparius Koch. Forty-three new chemicals have been introduced—those enumerated above and the following :

Alpha-naphtol,
Beta-naphtol,
Betol,
Bismuth Oxide,
Bismuth Salicylate,
Bismuth Subbenzoate,
Cocaine Hydrochlorate,
Quinine Hydrochlorate,
Caffeine Hydrochlorate,
Caffeine Hydrobromate,
Cresol Salicylate,
Cocaine Alkaloid,
Eucalyptol,
Ergotinine Alkaloid,
Guaiacol,
Hydrastinine,
Homatropine Hydrobromate,
Homatropine,
Hydrastine (in the U. S. P. as Hydrochlorate),

Menthol,
Paraldehyde,
Potassium Cantharidinate,
Physostigmine Salicylate,
Quassin (cryst.),
Resorcin,
Sparteine Sulphate,
Strontium Bromide,
Strontium Lactate,
Strontium Carbonate,
Strophanthin,
Terpin Hydrate,
Trional.

The newly added galenical preparations are the following: Iodoform collodion (10 per cent.); "coton hydrophile," corresponding to absorbent cotton, U. S. P.; "coton medicamenteux," plain gauze, to be impregnated with medicaments; extracts of cascara sagrada, witch-hazel, golden seal, kola nut, strophanthus, and wahoo (the latter powdered); medicated gauzes (borated, carbolated, and salol gauzes, each containing 10 per cent. of the active ingredient; $\frac{1}{10}$ per cent. corrosive sublimate gauze, and 10 per cent. iodoform gauze); pancreatin, dissolving fifty times its weight of fibrin, and converting forty times its weight of potato or wheat starch into glucose; peptone (made by the action of pepsin upon lean beef), completely soluble in cold water, but entirely insoluble in concentrated alcohol; creosote pills, made by incorporating 10 Gm. of beech-wood creosote with a sufficient quantity of powdered and dried almond-oil soap to make 100 pills; narceine syrup ($\frac{1}{10}$ per cent.); chloroformic solution of gutta-percha (10 per cent.); solution of hydrogen peroxide (10 per cent.); tinctures (all made by macerating 1 part of the drug in 5 parts of diluted alcohol for ten days). Cascara sagrada bark; witch-hazel bark, and leaves, golden-seal rhizome, kola nut, and strophanthus seed; borated vaselin (10 per cent.); wine of the kola nut, prepared by macerating 6 parts of bruised kola nut in 100 parts of Grenache wine for 10 days; diastase, converting fifty times its weight of potato or wheat starch into glucose; elixir of creosote, a filtered solution of 15 parts of beech-wood creosote in 985 of rum; cod-liver oil and creosote, a mixture of 15 parts of beech-wood creosote, and 985 of cod-liver oil; paper of mercuric chloride and sodium chloride, each piece representing 0.25 Gm. of $HgCl_2$, which, on soaking in 1 liter of water, produces a blue solution of the strength of 1 in 4000; sulphoricinated phenol, a 20 per cent. solution of carbolic acid in sulphoricinic acid; sulphoricinated creosote, a 10 per cent. solution of beech-wood creosote in sulphoricinic acid; sulphoricinated salicylate of phenol, a 15 per cent. solution of salol in sulphoricinic acid; 1 per cent. triturations of crystallized aconitine, crystallized aconitine nitrate, crystallized digitalin, and strophanthin; powder of mercuric chloride and tartaric acid, a mixture of mercuric chloride (0.25 Gm.), tartaric acid and indigo carmine, which, dissolved in 1 liter of water, produce a 1 in 4000 blue solution of $HgCl_2$; solution of caffeine for hypodermic injection, 25 per cent. and 40 per cent. strengths; solutions of cocaine hydrochlorate (2 per cent.), cocaine nitrate (2 per cent.), basic quinine hydrochlorate (30 per cent.), neutral quinine hydrochlorate

(50 per cent.), and crystallized digitalin ($\frac{1}{10}$ per cent.) The other additions are: Solutions of tartrate of iron and potassium, also called tinctura martis; terpinol, a colorless liquid made by distilling terpin hydrate and sulphuric acid; liniment of sulphoricinic acid, produced by the action of sulphuric acid on castor oil; and vaselin of mercuric chloride ($\frac{1}{10}$ per cent.)—Merck's Market Rep., 1895, 158.

The German Pharmacopœia.—Ed. III. (1890)—has been augmented by a supplement which took effect on April 1. It contains 12 additions of new chemicals, or drugs, or galenic forms of such; 3 of special medicinal preparations; 1 of a new form of medication, and about three dozen changes in old articles, tests or rules.

The 12 additions of chemicals or drugs are:

Name. ("Germ. Ph.")	Description. ("Germ. Ph.")	Corresponding or Similar Preparation in the "U. S. P." (or otherwise known in the U. S.).
Acidum Camphoricum.	See acid, camphoric, in our "Ready Reference Table."	None in "U. S. P."
Acidum hydrobromicum	"25 per cent.—Sp. gr., 1.208."	Diluted hydrobromic acid, "U. S. P.," —"10 per cent.—Sp. gr., 1.077."
Aqua cresolica.	"1 part cresol-soap solution to 9 water."	None in "U. S. P."—(a disinfectant similar to creolin solution in purpose.)
Bismuthum subsalicylicum.	See Bismuth, salicylate, BASIC, in "R. R. T."	None in "U. S. P."—A standard drug here, however.
Coffeïnum natrio-benzoïcum.	See caffeine and sodium, benzoate, in "R. R. T."	None in "U. S. P."—In good use here, however.
Cresolum crudum.	.....	Similar to "crude carbolic acid."
Formaldehydum solutum	"About 35 parts, by weight, of formaldehyde gas, in 100 water."	None in "U. S. P."—About 9 per cent. of the strength of the "formaldehyde," as here marketed.
Liquor cresoli saponatus.	"Clear, yellowish-brown liquid, by heating equal weights of crude cresol and potash soap."	None in "U. S. P."
Lithium salicylicum.	"Crystalline powder."	Practically identical with lithium salicylate "U. S. P."—"deliquescent powder."
Solutio acidi rosolici.	"1 : 100 alcohol."	"U. S. P." test solution: "1 : 10 alcohol; add water to 100."
Theobrominum natrio-salicylicum.	See "Theobromine-sodium and Sodium Salicylate," in "R. R. T."	None in "U. S. P."—well introduced here, however.
Tinctura aloës.	"1 : 5."	"U. S. P."—"1 : 10" (with 2 of licorice-root).

The 3 special preparations newly introduced are—besides a veterinary ointment of Cantharides—"Pastilli Hydrargyri Bichlorati" (Troches of Corrosive Sublimate), "Pilulæ Creosoti":

Beechwood Creosote	10 Gm.
Licorice-root, prod	19 Gm.
Triturate well together; then add:	
Glycerin	1 Gm.
Make into mass, and then into 200 pills.	

The reception of the Beechwood Creosote Pills into the Pharmacopœia is adjudged by the medical press of Germany "a great step in advance," on account of the "steadily growing significance of Beechwood Creosote in therapy of tuberculosis," and from the "great convenience of this form of administration." The new form of medication introduced is the Bougie. Of the CHANGES in old articles, but few have any special interest to American druggists, as they consist mostly of improvements in methods of testing, based on requirements different from those of the U. S. Pharmacopœia, or relating to articles not official with us.

The following might be of interest:

Buckthorn is hereafter to be subjected to the sensible requirement—first introduced by the U. S. P. and the British Pharmacopœia—that it should not be used until at least a year after being collected, so as to modify the irritant properties of the fresh bark.

In the preparation of Fluid Extracts, likewise, the U. S. P. process seems to have served as a monitor and model; for the period of maceration has now been raised from 24 to 48 hours, to correspond with the U. S. method.

Another point wherein American example has been followed is the test for arsenic in Reduced Iron (as well as in "Ferrum pulveratum"), where the Marsh process has been replaced by Bettendorf's reagent.

Fowler's solution is no longer flavored with "Spiritus Melissæ compositus," but with "Spiritus Lavandulæ"—also an approach to the American formula, although the Lavender Spirit there directed is not "compound" as with us.

The maximum doses allowable for iodine have been reduced: Single, from 0.05 Gm. to 0.02; daily, from 0.2 to 0.1 Gm.

In Sulphonal, the abuses shown to have resulted from the dose hitherto allowed have given cause to a similar reduction: Single, from 4 to 2 Gm.; daily, from 8 to 4.

The "Maximum-Dose Table" (A) is made to apply also to Enemata and Suppositories—thus distinctly classifying these forms of administration as "Internal Medication." This point is of general importance, as showing that clinical experience has demonstrated by the record of repeated casualties that the supposed smaller receptivity of the intestinal mucosa for drug influences (as compared with that of the stomach) is to be considered a dangerous myth.—Ibid., 149.

Prescribing and Dispensing.—Two great evils in medicine are the dispensing of medicines by physicians and the prescribing of medicines by pharmacists. In some instances, and under certain circumstances the duties of the physician and of the pharmacist merge together. In no instance is it intended that the physician and the pharmacist shall be combined in one person for all time. The physician's province is to prescribe medicines. It is the physician's privilege and right to have his prescriptions compounded by the pharmacist. The physician cannot be excused in our large cities—or even in towns having over 10,000 inhabitants at least—for combining in his practice the art of compounding and dispensing, or dispensing medicines compounded by another. On the other hand, it is the equal privilege and right for the pharmacist to compound the prescriptions of the physician and to influence and to send to a regular and competent practitioner those whom he encounters who are either misusing or likely to abuse any of the medicants ordinarly sold in the shop. The pharmacist should work to the interest of the physician, and vice versa. —Henry Kraemer in Alumni Jour., 1894, 180.

Liability of Druggist to Physician.—There seems to be no injustice in the last decision of the Supreme Court of Louisiana (16 Southern Reporter, 180,) affirming but qualifying the druggist's right to refuse filling any prescription submitted. A possible error of the prescriber, lack of certain ingredients, distrust of his own ability as a pharmacist, or other causes, may justify the druggist in declining to dispense the prescription.

In the case at issue (Tarlton *vs.* Lagarde) two prescriptions were declined—one containing a patent medicine as a component. On the witness stand the druggist averred his unwillingness to assume responsibility for such a prescription, since he could not inform himself of its exact composition. Of the other witnesses some supported and some disputed the claim that patent medicines frequently enter into physicians' prescriptions. The court rather favored the stand taken by the druggist.

The second prescription was refused for the want of the necessary ingredient "and other causes." The Court held that the druggist was not liable for damages when refusing to fill a prescription on grounds not impugning the physician's competency. If an impression unfavorable to the doctor is thus made on the patient's mind, the druggist is not accountable. But when the druggist indulges in public aspersions on the doctor's capacity, he incurs liability. The very exercise of his privilege to decline filling prescriptions should make the druggist considerate and cautious about conveying impressions damaging to the physician's reputation. In this instance the defendant druggist publicly commented on the doctor's prescriptions and derided his diploma. The Supreme Court accordingly increased the damages from $50 to $100.

The ruling is as fair as it is broad; it in no wise reduces the druggist's freedom of action; it affirms his proper privileges, and simply bids him

keep a civil tongue in his head when exercising those privileges.—Bull. Pharm., Amer. Drug. and Pharm. Rec., 1895, 9.

A National Pharmacy Law.—J. W. Wood says that the time has arrived when a national pharmacy law should supersede the various State laws; that a service to pharmacy and its followers will be the result of such, and that its enactment will at once disarm all reasonable criticism. We may well pattern after England or France, in establishing the profession of pharmacy upon that elevation to reach which demands not only a good pharmaceutical education, but one well grounded in such studies as our higher schools at least afford. It should be understood that pharmacy is not an ordinary pursuit for the investment of capital alone, but one which demands intelligence, business acumen, and professional knowledge of no mean degree, to secure it the recognition its scientific value deserves.—Merck's Mark. Rep., 1895, 67.

A Draft of a Proposed Pharmacy Law.—Oscar Oldberg (Apothecary, 1895, 145) has embodied his views in the form of a draft of a law. It is too long and of such a nature that it cannot be abstracted, but it is worthy careful study by law-makers.

Boards of Pharmacy.—Oscar Oldberg (Ibid., 168) says that the object of the pharmacy law should be to prohibit the practice of pharmacy by persons who are not pharmacists in the true sense, and bestow upon properly trained men the exclusive privilege of practicing this profession. No man should be appointed upon a board of pharmacy who is not an educated man. These men should have at least ten years successful school attendance, or the equivalent of the standard of requirements for graduation from our best high school; and should also be graduates of good pharmaceutical schools. These members to be decently compensated for their services. The members of the boards of pharmacy should be appointed in such a manner as will afford reasonable assurance that they are carefully selected and possess the requisite qualifications. The author considers in detail all the points that are to be considered in the formation of a good board of pharmacy, and specifies the character and abilities the members thereof should possess, and the requirements to be demanded of the candidate for admission to the practice of pharmacy.

The Military Pharmacist.—G. F. Payne (Brit. Pharm., 1895, 36; West. Drug., 1895, 43,) says that in the army of the United States there are three ranks only for the pharmacist—that of private in the hospital corps at $13 a month; acting hospital steward at $25 a month, and hospital steward at $50. Hospital steward ranks only as high as ordnance sergeant. In contrast to this, veterinary surgeons get $100 a month, stonecutters and carpenters, $3.50 a day; chaplains, $125 to $175 a month; assistant surgeons, $165 a month, and surgeons from $250 to $625 a month. In the navy the apothecary ranks only as a petty officer at $60 a

month, and the carpenters, sail-makers and gunners outrank him and get from $100 to $150 a month.

In charming comparison to this is the high professional position of pharmacists in European countries. In the Austrian army the pharmacists rank with the surgeons and assistant surgeons, running from the rank of lieutenant to senior lieutenant, captain, major, lieutenant colonel, up to full colonel. In the German army the service is arranged in a very similar manner, as is also that of Hungary. In the Italian army the rank is from second lieutenant through the various grade up to full colonel. In both the French and Russian armies the ranking is still higher, the highest official position of the apothecary in each of them being that of major general. What a contrast does our own service in the United States present! In the civilized world the dilatory action of the United States is only equaled by that of China and England. In the Japanese army the pharmacist receives the same pay and rank as that of second lieutenants, first lieutenants and captains, the ranks being divided into three grades. They besides receive additional pay for special duty.

The Military Pharmacist.—Dr. Chas. Rice says (Amer. Drug. and Pharm. Rec., 1894,) that, for the last twenty-five years at least, the pharmacists of the army and navy have striven to have their pay increased, as well as the position or rank advanced. They have appealed to every influential medical and pharmaceutical body to advocate their claims, and nearly every one of these bodies complied with their wishes and passed a resolution to that effect. But no success has attended the efforts so far. The reason is simply this, that not enough interest has been created in favor of the matter in the only place where it can attain success, that is in the Congress. If the members of this branch of the army and navy can induce the Secretary of the Navy to make the recommendation and to include the increased pay in his estimates, and if the Naval Committees of the House of Representatives and of the Senate, by a majority of each, approve the measure, the thing is done. There is no other way. And to create the necessary interest, it is not sufficient to send petitions or resolutions passed by societies, colleges, associations, etc., but to bring pressure to bear upon the members of the Committees through men of influence who can personally present the claims in a manner which will make their justice evident.

The Influence of Department Stores in Pharmacy.—C. S. N. Hallberg (West. Drug., 1895, 178). The department store is a perversion of the general or country-store idea. Its adaptation to metropolitan localities consists, according to the testimony of the proprietor of one of these concerns before the senatorial investigation committee, in the advantages afforded by:

1. Central location and concentration of business under one roof.

2. The consequent great convenience to the public in facilitating purchases and great advantage to the proprietor in attracting trade.

3. The great variety of merchandise handled always furnishing articles that are in season, thus promoting continual and steady trade irrespective of the seasons, and permitting the turning over of capital many times in the year.

4. The ability to buy goods in large quantities and the advantages afforded by forced sales, etc.

5. The reduced expense of conducting business afforded by operations on a large scale.

These acknowledged advantages present the essential features upon which the business of the department store is based. The subterranean methods, some of which were also disclosed, may be summarized as follows:

Advertising seasonable goods below cost in season in order to attract buyers.

Addressing themselves chiefly to women, knowing that the women are the disbursers for the household.

Buying job-lot, unseasonable, and otherwise inferior goods, and by tempting cash offers to prevail on manufacturers to sell large lots of goods at much less than they can be duplicated for, thus forcing manufacturers to reduce the cost of production by the usual alternative—a reduction in the wages of workmen.

To displace the wholesale dealer in order that the manufacturer may be powerless to resist their tempting cash offers of 50 cents on the dollar.

To arrange with manufacturers for goods of inferior quality, fraudulent imitations or fictitious brands.

To throw the manufacturers overboard at the first opportunity, having "sucked them dry," one after another until the entire country's list is exhausted or closed by the sheriff, and then to repeat the operation with European houses.

To themselves manufacture spurious goods and imitations of well-known brands under fictitious names.

To engage the cheapest kind of help, chiefly child-labor, and by a system of espionage and fines reduce them to a condition approaching that of slavery, and, in the case of young women, something still worse.

The author holds against successful contradiction,

That the sale of drugs and medicines, whatsoever the form, should be confined to those who by training and experience have become qualified to serve the public intelligently.

That since the opening of drug departments in the department stores there has been a great increase of fatalities from accidental poisoning.

That the quality of medicines has been lowered and that the use of preparations containing opium and other noxious drugs has been largely increased.

That, aside from the pernicious effects on the physical and moral health of the public, the sale and dispensing of drugs and medicines should be done only under the personal supervision of a qualified employé, and not be left to the mercenary discretion of irresponsible, unskilled and half-starved women and children.

That matters concerning health or disease, life or death, must not be used as the means through which medicines are used as decoy articles portrayed in alluring advertisements to dupe the sick and the afflicted. The constantly expanding encroachments of the department octopus are seriously threatening legitimate pharmacy. No vocation requires more preparation and study to master, no business requires such application and close confinement, no calling is so unremunerative or so unproductive after a life-time's devotion to the acquirement of a competency, no person serves the convenience of the public at all hours day and night as does the druggist.

The testimony wrung from some of these trade Napoleons by the recent senatorial investigating committee is alone sufficient to stamp their alleged business methods as illegitimate, their managers as commercial pirates, and their operations as the essence of a conspiracy against trade, a gigantic trust whose tentacles reach out for the public press that public opinion may be throttled.

The New Publication.—The Pharmaceutical Journal and Transactions (1894, 380) recently inadvertently credited an article to a certain American publication, in which it appeared as original matter. The editor subsequently learned, however, that this article was original in another American journal, the one having given no credit to the other where it was due. The editor of the Pharmaceutical Journal and Transactions, in speaking of his own innocence in the matter, and regret for inadvertently giving credit where not due, says also: "Such venial errors are at times unavoidable in the face of the peculiar system followed by many editors, who seem to prefer to take responsibilities they have not incurred rather than quote the source of their 'original' articles, translations and abstracts. In pharmaceutical journalism we are probably the greatest sufferers by this practice, which is indulged in much too freely by some of our transatlantic contemporaries. Whilst only too pleased to find our subject matter regarded as of sufficient importance to be worthy of more or less extensive reproduction, we venture to submit that it is not too much to expect proper acknowledgment to be made in every instance. In such cases as the one which has given occasion for the publication of this note, apologies are due to those who are misled by the omission to furnish such acknowlegment, no less than to the original publisher of the information. It may occasionally happen, in the pressure of business, that the omission is purely inadvertent; but it is pitiful, to say the least, to see that journals claiming reptuation persistently

and continually ignore the most elementary notions of courtesy and honesty.

The Future of Pharmacy.—H. A. D. Jowett (Brit. and Col. Drug., 1894, Dec. 21). After mentioning the almost universal admission that pharmacy was "in a bad way," and remarking that there must be some cause for this, the author went on to trace such cause or causes as had led up to the present state of affairs, to see whether they were in operation now, and would continue to be in the future. Pharmacy was both a profession and a trade, and consequently little analogy could be found between it and most trades. The combination of trade and profession in it did not work well—*e. g.*, notice the social status of the apprentice, of pharmacists themselves, and the pecuniary inducements held out to indoor assistants. The public did not look on the pharmacist as a professional man. The author then went on to consider the two sides of pharmacy separately, and to account for the decay of either. One of the causes for decay on the professional side was the non-educating to a professional stand-point. The future next was treated. Mr. Jowett thought, on the trade side, the stores would entirely replace the pharmacist and then the community take over the stores. On the professional side, personality must always be the determining factor, and this was the thing to which to pay attention. In this respect the author pointed out the methods of earning a livelihood by analysis, &c.

Drug Imports—The monthly report of the Bureau of Statistics gives the following data of importations into the United States during the ten months ending April 30:

	1894.	1895.
Alazarine and products, pounds	2,806,357	4,372,939
Argols, crude, pounds	18,152,843	23,303,234
Barks, Cinchona and other from which Quinine is extracted, pounds	2,055,579	1,554,845
Cochineal, pounds	85,424	113,630
Logwood, tons	42,826	51,727
Dyewood, Extracts, etc., pounds	1,964,316	2,950,300
Glycerin, pounds	7,467,560	10,900,607
Gum Arabic, pounds	854.201	1,300,430
Gum Camphor, crude, pounds	1,235,067	1,392,306
Gum Shellac, pounds	3,635,583	4,845,674
Gambier, pounds	20,772,794	26,454,392
Indigo, pounds	1,239,467	3,427,346
Liquorice Root, pounds	51,352,354	70,145,644
Bleaching Powder, pounds	65,431,149	82,869,246
Opium, crude, pounds	643,605	254,459
Opium, prepared, pounds	37,201	111,033
Potash, Chlorate, pounds	3,258,690	3,705,865
Potash, Muriate, pounds	70,395,055	77,227,717
Saltpetre, crude, pounds	6,597,945	7,222,138
Potash, other salts of, pounds	18,827,722	26,089,415
Quinine, Sulphate, ounces	2,042,714	1,233,512
Soda, Caustic, pounds	32,391,607	48,173,731
Soda, Nitrate, tons	77,312	106,156
Soda, Sal., pounds	13,346,584	25,372,388
Soda, Ash, pounds	215,858,547	260,873,852
Soda, other salts of, pounds	11,901,470	10,240,051
Brimstone, crude, tons	70,747	100,927
Sumac, ground, pounds	6,358,065	10,241,658
Vanilla Beans, pounds	136,989	111,335

The declared value of drugs, chemicals, dyes, etc., imported into the United States during the ten months ending April 30, 1895, is $36,470,-312, including $25,471,628 free and $10,998,684 dutiable goods. For the corresponding period last year the total was $30,665,401, of which $22,-483,125 free and $8,182,273 dutiable goods.—Amer. Drug. and Pharm. Rec., 1894, 389.

General Formulas.

To Color Brass Brown.—Dingler's Polytechnisches Journal recommends the following method of producing a fine brown color on brass: In a quart of water dissolve about 1 dram each of verdigris and sal ammoniac. Let stand for three or four hours and add 3 pints more water. The brass article to be colored must be freed from grease and heated over a charcoal fire until, when touched with the moistened finger, it gives the snapping sound so well-known to those who have watched the laundry woman test her irons. The liquid is then painted over the surface with a pencil or swabbed on with a rag. Repeat the heating and swabbing until the surface assumes a fine, even dark brown, which is durable and handsome. To make a deep and lasting covering sometimes twenty coats are

required. As they are put on rapidly, however, and as the effect is excellent, one can well afford a little extra trouble.—Amer. Drug. and Pharm. Rec., 1895, 4.

Liquid Bronze Paint.—The most important point to be observed is the complete neutralization of the liquid medium used. For ordinary purposes dammar is to be recommended, only the solution must be completely neutralized. For this purpose mix a dilute solution of caustic potash with a solution of dammar in benzol, agitate thoroughly, allow to settle, draw off the dammar solution and use this for mixing the bronze powder with. The relative proportions of liquid and powder should be determined by experiment. Borax-shellac solution also gives very satisfactory results as a medium. A mixture of 35 parts of bronze powder, 25 parts of diluted bleached borax solution and 10 parts of alcohol yields a satisfactory preparation.—Ibid., 1894.

Bronzing Liquid.—In Brit. and Col. Drug., 1895, 83, is found the following formula:

Aniline red	10 parts.
Aniline purple	5 "
Benzoic acid	5 "
Methylated spirit	100 "

Dissolve the aniline in the spirit, then add the acid, and heat on the water-bath until it changes from greenish to bronze.

Perfumed Tar-camphor.—The Drog. Zeit.; Am. Drug. and Pharm. Rec., 1895, 141, gives the following:

Naphthalin	2400 parts.
Camphor	780 "
Cumarin	2 "
Nerolin	1 "
Nitrobenzol (misbane)	54 "

Melt the camphor and naphthalin together on a water-bath, and add the other ingredients before the mixture congeals.

Acid-Proof Cement.—The following preparation is recommended for cementing glass, porcelain, or other vessels intended to hold corrosive acids:

Asbestos	2 parts.
Barium sulphate	3 "
Sodium silicate	2 "

By mixing these ingredients a cement strong enough to resist the strongest nitric acid will be obtained. If hot acids are dealt with, the following mixture will be found to possess still more resistant powers:

Sodium silicate	2 parts.
Fine sand	1 "
Asbestos powder	1 "

Both these cements take a few hours to set. If the cement is wanted to set at once, use potassium silicate instead of sodium silicate. This mixture will be instantly effective, and possesses the same power of resistance as the other.—Ibid., 1895, 73, 339.

Cement for Cycle Tires.—Bisulphide of carbon, 160 parts; gutta-percha, 20 parts; caoutchouc, 40 parts; isinglass, 10 parts. This cement is dropped into the crevices after they have been properly cleaned. If the rent is very big apply the cement in layers. Bind up the rubber tire lighty with thread, let dry for twenty-four to thirty-six hours, cut off the thread and remove the protruding cement with a sharp knife, which must previously have been dipped in water.—Ibid., 338.

Cement for India Rubber Shoes.—No. 1, caoutchouc, 10 parts; chloroform, 280. No. 2, caoutchouc, 10 parts; brown resin, 4 parts; thus, 2 parts; oil of turpentine, 40 parts. Solution No. 1 is produced by simply leaving the caoutchouc standing in a bottle with the chloroform. For solution No. 2 melt the finely-cut caoutchouc and the resin, add the thus, and dissolve the whole in the oil of turpentine. Mix both solutions.—Ibid., 338.

Cement for Ivory.—

Isinglass	120 grains.
White gelatin	240 grains.
Mastic	12 grains.
Alcohol	10 minims.
Zinc oxide	30 grains.
Distilled water, a sufficient quantity.	

Swell the isinglass and gelatin in seven and a half fluid ounces of distilled water; then dissolve in a water-bath, and evaporate down to ten drams, add the mastic, previously dissolved in the alcohol, and then incorporate the zinc oxide by trituration.—Ibid., 325.

Cement for Celluloid.—To cement celluloid to paper or leather the following formula is given:

Camphor	1 oz.
Shellac	6 oz.
Alcohol	30 fl. oz.

To cement celluloid to wood, iron or glass, or to celluloid itself, use the following:

Celluloid waste, rasped.
Acetone; of each a sufficient quantity.

—Ibid., 325, 326.

A Good and Cheap Cement.—Put half an ounce of Brazilian isinglass in a vessel and add 2 ounces of water; put the vessel into a saucepan half full of water, and place it on the fire: add 1 dram of powdered gum ammoniacum; keep it constantly stirred. When dissolved add 1 ounce of methylated spirit; pour the spirit into the vessel in a thin stream, with constant stirring. When thoroughly mixed add 4 drams of spts. mastic; stir for three minutes and stock. Spts. mastic is made by adding 1 dram of gum mastic to 1 ounce of methylated spirit.—Brit. and Col. Drug., 1894, 445.

Cleansing Agents.—Frank Edel uses oleate of ammonia (Bull. Pharm., 1895, 155) as follows:

Preparation of Oleate of Ammonia—

Oleic acid	1 oz.
Alcohol	1 oz.
Aqua ammonia, 16°	14 oz.

Pour the acid into a pint bottle; mix the alcohol and ammonia, and pour into bottle containing the oleic acid. Cork tightly, and allow to stand for a week or more until saponification is complete.

This, for some reason, furnishes a product superior to that made by any other means the writer has ever tried. It can be diluted with ammonia or water as wanted, and is the product meant to be used in the formula that follows:

For cleaning Glassware in the Laboratory.—

Powd. pumice stone	2 oz.
Oleate of ammonia	3 oz.
Aqua ammonia, 16°, enough to make	16 oz.

Shake before using.

An Insulating Enamel.—An insulating enamel for coating sheet-iron insulators is made by mixing together silica, borate of soduim, clay, arsenate of sodium, phosphate of lime and nitrate of sodium. The proportion of each ingredient used is the subject of a patent.—Brit. and Col. Drug., 1894, 307.

Etching on Glass.—When quartz, or any silicate, such as glass, is exposed to the action of hydrofluoric acid, it is decomposed, forming fluoride of silica SiF_4, and water. This is, however, at once decomposed by the water, forming silicic acid and hydrogen silico-fluoride.

$$3\,SiO_2 + 12\,HF = 3\,SiF_4 + 6\,H_2O = 2\,SiF_6H_2 + SiO_4H_2 + 2H_2O.$$

This chemical action is the basis of etching on glass; however, the obscuring of glass by etching does not rest upon its decomposition alone, but also upon crystallization, for which the volatile hydrogen silico-fluoride is indispensable. If we examine the surface of chemically obscured glass

with a microscope, we find it coated with minute transparent crystals, which break the rays of light and give the opaque appearance to the glass. These crystals are silico-fluorides, insoluble in water, formed by the action of the above mentioned hydrogen silico-fluoride upon the soluble alkali fluorides in the water, such as potassium fluoride, KHF_2, sodium fluoride $HNaF_2$, or ammonium fluoride, NH_4HF_2. In the chemical reaction, the alkali metal displaces the hydrogen of the hydrogen silico-fluoride :

$$H_2SiF_6 + 2\ HKF_2 = K_2SiF_6 + 4HF.$$
$$H_2SiF_6 + 2\ HNaF_2 = Na_2SiF_6 + 4\ HF.$$
$$H_2SiF_6 + 2\ H(NH_4)F_2 = (NH_4)_2SiF_6 + 4\ HF.$$

The bath, then, in which the glass is to be dipped, must contain an alkali fluoride, and must generate hydrogen silico-fluoride. The best way to prepare the bath is to simply dissolve an alkali salt in hydrofluoric acid, which will decompose it, forming the fluoride :

$$4\ HF + K_2CO_3 = 2\ HKF_2 + CO_2 + H_2O.$$

In a similar way the fluorides of sodium and ammonium may be prepared. The alkaline salt should be stirred in until the acid is entirely neutralized. The solution is prepared by diluting one pint concentrated acid with 12 gallons water, neutralizing with potash or soda, and then adding three-quarters of a pint more acid. It is then ready for use. The glass to be etched must be carefully cleaned before being placed in the bath. It should stand for ten minutes in a bath made by diluting one pint of acid in eight gallons of water.

Potash salts give the finest etching, but are much slower in acting than sodium. (M. Havrauek, in translation in Amer. Manufacturer.)—Pharm. Era, 1894, 300.

Adherence of Metals to Glass, etc.—C. Margot finds that aluminum, magnesium, cadmium and zinc possess the property of marking glass and other substances containing much silica, in such a way that neither rubbing nor ordinary washing will remove the marks. Taking advantage of this curious property, he has constructed pencils and wheels of aluminum, by means of which designs can be drawn upon glass, and it is understood that mirrors, etc , now being sold in London, which reveal figures and various devices when breathed upon, are prepared in this way. The effect is much the same as when sketches are drawn on glass with French chalk, but more permanent.—Arch. Soc. Phys. et Nat. de Genève and Jour. de Pharm. (6), 1, 263.

New Silvering Process for Glass.—Auguste and Lumière contribute to the Journal de Physique a process for rapid silvering of glass, which they claim has certain advantages over the older processes. In it formaldehyde is used as the reducing agent. A trial of the new formula by the editor

of the National Druggist does not show any marked superiority over Liebig's process, in which ammonium aldehyde is the reducing agent, though it is much more rapid than the method of reduction by Rochelle salt. The process of Roux and Lumière is as follows: To 100 parts, by volume, of a 10 per cent. solution of silver nitrate (the commercial crystallized), add sufficient ammonium hydrate to redissolve the precipitate first formed by adding it. As any excess of ammonia is to be avoided, it is best to stop the addition of ammonia before the precipitate is entirely redissolved, and to get rid of the excess by filtering. Make the volume of the filtrate up to 1000 parts by adding distilled water. The reducing agent is the commercial solution of formaldehyde (40 per cent.) diluted down to 1 per cent. (25 parts in 1000 parts of water). One part of this solution reduces 2 parts of the silver. After the glass is prepared for silvering by making it chemically clean, the liquids are mixed, in the proportions indicated above (*i. e.*, 1 part of the reducing liquid to 2 parts of the silver), and poured in a continuous stream over the glass, which latter is arranged with a dam to prevent the liquor from flowing off. At a temperature of between 60° and 70° F., all the silver is reduced in from 5 to 10 minutes, being thrown down in a beautifully even and bright layer, which firmly attaches itself to the glass. The subsequent tests are the same as in other processes.—Nat. Drug., 1894, 147.

Ink for Writing on Glass.—Neueste Erfindungen und Erfahrungen gives the following:

White lac	10 parts.
Venice turpentine	5 parts.
Oil of turpentine	15 parts.
Indigo, in powder	5 parts.

Melt the lac and turpentine together in a water-bath, and add the oil of turpentine. Finally stir in the indigo.—Nat. Drug., 1894, 113.

Ink for Etching on Glass.—The Bayrische Ind. u. Gewerb. Blatt. gives the following:

Sodium fluoride	9 drams.
Potassium sulphate	108 grains.
Water	16 fl. ozs.

Make a solution and label "Solution No. 1."

Zinc chloride	216 grains.
Hydrochloric acid (concentrated)	10 fl. drams.
Water	16 fl. ozs.

Label "Solution No. 2."

Mix equal quantities of the solutions in a gutta percha or leather vessel, or in a glass vessel, the interior of which has been covered with a layer of

paraffin, or in a hollow in a piece of paraffin wax.—Amer. Drug. and Pharm. Rec., 1894, 326.

New Solvent for Gold.—The Engineering and Mining Journal has a report from London of experiments with a new solvent of gold. A 5 per cent. solution of cyanide of potassium will dissolve gold leaf in about 12 hours, but if bromide of cyanogen in amount equivalent to the cyanide be added, the same quantity of leaf is dissolved in a few minutes. The reaction, as given by H. L. Sulman, is

$$3\,KCy + BrCy + 2\,Au = 2AuKCy_2 + KBr.$$

It is said that the solvent will dissolve gold from unroasted pyrites, but this, the Journal says, calls for some proof. A Gold Ore Treatment Company has been organized to exploit the discovery.—Ibid., 1895, 158.

Liquid Glue.—A process for making rapid drying, preservative liquid glue of great adhesiveness, by combining aqueous solutions of glue and chloral hydrate, has been patented in Germany.—Ibid., 1894.

Liquid Glue.—With any desired quantity of glue, use ordinary whiskey instead of water. Break the glue in small fragments, and introduce these in a suitable glass vessel, and pour the whiskey over them. Cork tightly, and set aside for three or four days, when it will be ready for use, without the necessity of applying heat. Thus prepared, the mixture will keep unaltered for years, and will remain perfectly liquid, except in very cold weather, when it will be found necessary to place the bottle in warm water for a little time before using. The vessel in which it is kept must, of course, be kept always tightly corked to prevent the volatizing of the solvent.—Nat. Drug., 1894, 113.

Henna.—Henna, known to Europeans almost solely as a hair-dye, holds an important place in Arabian Pharmacy, according to the reports of M. Ehrmann. With them it is used principally in the form of a powder of greenish-brown hue, showing an orange tinge when exposed to the light. It is formed by simply drying and then powdering the leaves of the Lawsonia alba. As among the earliest Egyptians, it is used by the Arabians as a cosmetic. Its slightly tanning effect toughens the skin, lessens the perspiration, and protects the skin against sudden changes in temperature. Almost all the women and many of the men dye their hands and feet with the powder after the following manner: The powder is moistened in a little water, and the paste spread upon the extremities, which are bandaged with linen on going to bed. By morning the color, a bright yellow, had become sufficiently endyed to last without renewal for fifteen or twenty days.

The "koheul" of the Arab women is made with powdered henna, mingled with lemon-juice, this preparation being considered superior to that made with antimony. The Arab proverb says, "that every woman who

smears her eyelids with koheul, her hands and feet with henna, and perfumes her breath, is pleasing to God and to her husband."

In a more strictly therapeutic sense, the powder is used in the treatment of rhagades and ulcers; while a decoction of henna is prescribed in diarrhœa, hepatitis and calculous disease. It is a commonly used parasiticide for pediculi. Cataplasms of henna and anise are employed for the relief of migraine.—Amer. Drug. and Pharm. Rec., 1894, 94.

To Harden Leather.—Riguot (Chem. Zeit., [Rep.], 1894, 169), suggests the following method for hardening the end of leather bands. First, free from fat by dipping in a warm soda solution, and when dry put for fifteen minutes into a boiling hot 10 per cent. solution of borax; allow the whole to cool and finally dry. The leather so treated is horny, and, if it is light, transparent. It is very hard, and not brittle, so that it can be cut with a knife. So long as a leather so treated is yet damp, it can be very easily pressed into any desired shape.

Black Stain for Iron.—Among other formulas for coloring iron black by producing on it a precipitate of cupric oxide, George Buchner recommends the following (Bay. Ind. u. Gewerb. Blatt.): Paint the iron while slightly warm, with a solution of 7 parts of copper nitrate in 3 (?) parts of water, and then warm the article on an iron plate. When cold rub off the cupric oxide coating, when a gray adherent coat will be left, which after repeated treatment becomes a fine black. If manganese nitrate be substituted for the copper salt, a rich bronze tone will be obtained.—Amer. Drug. and Pharm. Rec., 1895, 39.

Mucilage Pencil.—Sapple gives the following formula (Neueste Erfind. u. Erfahr.): Warm 28 parts of dextrin in 32 parts of water until solution is effected; in this solution put 54 parts of best glue and 4 parts of sifted zinc white; after standing eight hours, warm the mass in a water-bath until the glue is melted; after mixing thoroughly by stirring, add 160 parts of glucose, previously melted on a water-bath, and stir. Pour the mass into cylindrical tubes, and allow it to harden.—Ibid., 1894, 326.

Solid Portable Mucilage.—

White glue	4 parts.
Isinglass	1 part.
Sugar	2 parts.
Water	A sufficiency.

Boil the glue and isinglass in enough water to dissolve, strain and add the sugar. Evaporate on a water-bath until a little of the liquid sets hard when cold, then pour into molds.—Ibid., 1895, 141.

To Clean Nickel.—The best cleaning compound for nickel ware is 50 parts of alcohol and one of sulphuric acid. The article to be cleaned is held in the solution five to fifteen seconds, after which it is washed with

water, rinsed with alcohol, and wiped dry with a clean rag. The dirtiest of nickel goods is said to come out with a bright, new look.—Pharm. Era, March 21, 1895.

Paste for Bottle-Labels.—Zweiffler, after many experiments, prefers a paste of dextrin, to which thymol, in the percentage of 1 part to 2000, has been added. He maintains that the thymol, while not interfering in the slightest with the great adhesive properties of dextrin, makes it proof against the action of moisture, which has hitherto been the great objection to it.—Nat. Drug., 1894, 393.

Paraffin in Pomades.—E. Cranzell strongly recommends paraffin as a secondary ingredient to give consistence in pomades, such as the various cerates, cold cream, chloroform ointment, camphor ointment, etc., in place of the dearer white wax, or spermaceti. It is not only cheaper but better. Cranzell says: It will aid in keeping such preparations, which, owing to the ready oxidation of the fats composing them, are prone to rancidification. The three products—white wax, spermaceti and paraffin—have a close analogy in their physical properties, densities, points of fusion, solubility in certain liquids, etc.

In point of stability and other principal properties, pomades with paraffin as a base are in no whit inferior to those prepared with white wax or spermaceti. Take Galen's cerate, for example, prepared with paraffin in the proportion that white wax is generally used, and it will be found even whiter than the old product, and less unctuous. The same applies to cold cream. The great and real value of paraffin, however, lies in its inalterability and that quality in cerates, etc., made with it.

In the opinion of Cranzel, paraffin is destined to replace wax, both white and yellow, and spermaceti in all preparations in which the latter now enters, even as lard has been supplanted by vaselin in current use—for other reasons, it is true, but for analogous considerations.—Ibid., 1895, 110.

An Elegant and Brilliant French Polish.—De la Rogére gives the following as the formula for a polish for woods, which has a magnificent and unrivalled brilliancy: In 1,500 parts of alcohol of 94° dissolve 30 parts sulphuric ether, 25 parts lavender oil, 25 parts spike oil, 30 parts boric acid, 7 parts camphor, 30 parts hard copal, 100 parts sandarac, 365 parts shellac, 30 partz benzoin, 30 parts balsam copaiba, and 5 parts tincture of cinnamon. This polish may be applied with the pencil, or with the polisher's "daub" (a ball of cotton covered with silk or linen). No oil is used on the latter when thus applied.—Nat. Drug., 1894, 354.

To Remove Rust Spots from Wash Goods.—The following is Schneider's process: While wet treat the spots with a 5 per cent. aqueous solution of tannin, and lay aside for six hours; rinse in clear water, wash with soap, and again rinse. Rub the spots with a 5 per cent. aqueous solution of

oxalic acid; let stand for six hours, and rinse with clear water. Most spots are removed by this process without the least injury to the fabric; but if they resist this treatment, try the following: Wet the garment and rub the spot with a 1 per cent. solution of potassium sulphide, let stand for six hours and rinse, wash with soap and rinse again. The spots are now quite black, but the application of dilute acetic acid, after standing a few hours, removes them completely. Rinsing completes the process.—Ibid.

To Protect Implements from Rust.—Olmstead recommends rosin melted with 6 or 8 parts of lard as the best protection for iron or steel instruments, or implements of any kind, against rust. Objects anointed with it will remain free from corrosion for years.—Nat. Drug., 1895, 147.

To Get Rid of Aniline Stains on Garments.—Helbig's process is as follows: Dip the spots into a concentrated solution of potassium permanganate, let remain until the spots are uniformly red or brown, and then remove to a solution of sulphurous acid in water. The latter quickly removes all traces of the spots.—Ibid.

Removal of Lunar Caustic Stains.—Stains of silver nitrate may be removed from clothing, etc., according to Hahn (Monatshefte f. prak. Dermatol.), by the following process: Make a solution of 5 parts each of bichloride of mercury and ammonium chloride in 40 parts of water. Wet the spots with this solution and then rub lightly with a linen rag. Even old spots will vanish completely under this treatment, which may also be applied to stains on the skin. On the application of the liquid the spots become light yellow, and soon after entirely disappear.—Ibid.

Ink for Rubber Stamp Pads.—The Pharmaceutical Journal and Transactions gives the following: Inks suitable for typewriters serve equally well, with slight modifications, for stamping pads. Thus oil-soluble aniline colors, when dissolved in castor oil, answer for either purpose. A modification of a type-writer ink may be used, and is as follows: Castor oil, 4 parts; creosote or carbolic acid, 1 part; cassia oil, 1 part; and oil-soluble aniline color, 1 or 2 parts. As a rule, however, oily inks are unsuitable for rubber stamps, those prepared with glycerin being preferable. A general formula for the latter is as follows: Aniline color, 1½ ounces; boiling water, 6 ounces; methylated spirit, 6 ounces; glycerin to make 1 pound. Mix in the order given. Half of the glycerin may be replaced by treacle. The spirit is necessary to ensure rapid drying.—Nat. Drug., 1895, 147.

Copying Ink for Type-writers.—The Bayerische Industrie-und-Gewerbe Blätter gives the following: Dissolve 30 parts of soap in 125 parts of glycerin; add 720 parts of alcohol and 360 parts of water, and dissolve in the mixture sufficient aniline to give the desired color. If the ink is too penetrating add more soap, and if not sufficiently so, decrease the quantity.—Ibid., 1894, 393.

Flexible Varnishes.—T. Koller (in Neueste Erfind. u. Erfahr.; Amer. Drug. and Pharm. Rec., 1894) gives the following:

Alcoholic Varnish.—	Parts.
Sandarac	48
Venetian turpentine	1
Mastic	24
Alcohol	120

Elastic Copal Varnish.—	Parts.
Camphor	1
Copal	4
Ether	12

Allow to stand for a week, and decant the solution.

Varnish for Bottle Caps.—	Parts.
Gutta-percha	1
Shellac	10
Turpentine	1
Alcohol	45

Elastic Dammar Varnish.—	Parts.
Gum Dammar	4
Acetone	20
Collodion	3
Shellac varnish	4 to 6

Powder the gum dammar, allow to stand for fourteen days with the acetone, separate the clear solution, and mix with collodion and shellac varnish.

Elastic Varnish for Iron.—

Melt asphalt and add to it a sufficient quantity of petroleum.

Elastic Rubber Varnish.—	Parts.
Rosin	2
Rubber, cut fine	1
Linseed oil	2

Melt the rosin, heating until the mass begins to give out white vapors, then add the pure rubber gradually with constant stirring, heating until the mass is fairly uniform, then add the linseed oil gradually and heat until disagreeable vapors are given off. Remove from the fire and stir until cold.

Celluloid Varnish.—	Parts.
Gun cotton (pyroxylon)	1
Ether	3
Alcohol	4
Camphor	0.25

Dry the gun cotton over sulphuric acid and pour over it the ether and

alcohol, decant the clear solution after a few days and add the camphor; this can be diluted, if necessary, with wood alcohol, and may be colored with any desired aniline tint. This varnish has the advantage over zapon that it contains no amyl alcohol nor amyl acetate, which produce headache and irritation of the respiratory organs.

Colorless Solution of Shellac.—Dissolve 150 Gm. of shellac in a liter of alcohol by the aid of gentle heat, in a water-bath. Stir in about 150 Gm. freshly burned animal charcoal, and bring the mixture to a boil, maintaining it at this temperature about ten minutes. Filter a small portion, and if not absolutely colorless, add a little more charcoal and again boil. After again testing, if found to be quite free from color, first strain through silk, and subsequently filter through paper. The resultant solution, with the addition of a little castor oil, to ensure elasticity, makes the best varnish for prints, paintings, etc.—Nat. Drug., 1895, 83.

Varnish for Tin.—

Common turpentine	8 parts.
Boiled linseed oil	of each 4 parts.
Amber	of each 4 parts.
Shellac	1 part.

Melt together and color with curcuma, or with aniline dyes.—Brit. and Col. Drug., 1894, 261.

Solvent for Shellac, Pyroxylon, etc.—By mixing crude amyl alcohol with methyl alcohol and benzine and distilling the mixture with acetic acid, and removing the water with calcium chloride, a solvent is obtained for shellac, pyroxylon and similar substances. Ethyl alcohol may be substituted for amyl alcohol if desired, as can turpentine for the benzine.—Amer. Drug. and Pharm. Rec., 1894.

Preservation of Wood.—A new process for the preservation of wood, says Le Genie Civil., has recently been made known by Zironi. It consists in heating the wood, say by means of a worm, in a closed vessel, in which a vacuum is created. The heating is done in a vacuum in order to extract the sap that fills the pores of the wood. After this has been effected a solution of resin in a hydrocarburet is introduced into the vessel. After the wood has become saturated, the liquid is drawn off and a jet of steam is introduced. This removes the solvent, while the resin remains in the pores of the wood, which, through this process, undergoes a great increase in weight.—Ibid.

To Make Wood Uninflammable.—R. Stubling states (Bayerische Ind. und Gewerb. Bl.), that inflammability of wood is much decreased by treating it under pressure with a 6 per cent. solution of potassa, or a 4 per cent. solution of soda.—Ibid.

The Browning of Oakwood.—According to the Moniteur Industriel, the

dark oak employed in decorative woodwork is prepared by submitting the wood to the action of ammoniacal vapors, which rapidly give the dark tint that is in so much request. The method consists simply in arranging the material to be rendered of a dark color in a tight room, into which no light penetrates. For small pieces, a large box, whose joints are closed with strips of paper glued to the places whence the vapor might escape, fully suffices. For larger pieces there should be a hermetically closed room. Into the box or room are put several flat glass vessels containing liquid ammonia, and placed upon the floor, so that the vapor may fill the space and give the tannin of the oak a very dark brown color, which will not be altered if a little of the wood be removed from the surface. The liquid should not touch the wood, and the depth of the color will depend upon the quality of the ammonia employed, and the length of time of the exposure to its fumes.—Ibid.

To Make Paper and Cloth Waterproof.—According to the Norwegian patent of Jagenberg, this can be accomplished by soaking the cloth or paper in solution of glue, and allowing this to be acted upon by formaldehyde either as a gas or in solution.—Ibid.

Medical and Pharmaceutical.

Germany's Doctors.—Germany, whose population is about 50,000,000, had 21,621 physicians in 1893, against 20,500 in 1892; that is, an increase of 1,521, says the New York Tribune. That makes 4.37 doctors for every 10,000 inhabitants, but they are not equally divided throughout the empire; for in some regions there are not even two doctors for every 10,000 inhabitants, while in other districts there are 30 of them for the same number of population. Germany possesses also 915 dentists and 4,978 druggists.—Alumni Jour., 1895 (May), 135.

Anæsthetic Solution.—For obtaining local anæsthesia, Schleich recommends:

Cocaine hydrochlorate	.2
Sodium chloride	.4
Morphine hydrochlorate	.05
Distilled water	200

The water should at first be in excess, and then be boiled down in order to sterilize it. The active ingredient in producing anæsthesia is the water; the cocaine merely renders the introduction of the water painless, and this latter then, as Liebreich has shown, produces the local anæsthesia.—Brit. and Col. Drug., 1894, 462.

Treatment of Simple Angina.—Darbouet reports excellent results from the application of a mixture of guaiacol and glycerin in cases of simple angina accompanied by secretion of phlegm, etc. For adults he uses

equal parts of guaiacol and of glycerin, and for children he recommends one of the former to two of the latter. It is necessary to shake the mixture well every time before using it, as the two substances separate on standing. It should be applied four times a day.—Amer. Drug. and Pharm. Rec., 1895, 206.

Administration of Bone Marrow.—The following is the method by which the marrow for a daily dose is prepared: Three ounces of the fresh bone marrow (as much red as possible) are made up into a paste, with port wine 1 ounce, glycerin 1 ounce, and gelatin 5 drams. A little care is required in making the paste, to keep the gelatin and the marrow sufficiently fluid for them to be thoroughly mixed. The gelatin should be soaked in sufficient water to soften it, and then should be melted with the glycerin, the mixture being kept in a mortar previously made hot with boiling water, while in another mortar, made hot in a similar manner, the marrow and wine are mixed. Then the contents of the two mortars should be thoroughly incorporated and allowed to set. There seems to be no difficulty in supplying the marrow free from bone spicules.—Ibid., 1894.

Preservation of Blood.—H. Kral (Pharm. Centralh., xxxvi., 90) recommends ether as a preservative of blood. A sample, subjected to all the temperatures of the various seasons of the year, even to direct summer sunlight, was kept perfectly for over two years after the addition of 2 per cent. of ether. Not the slightest indication of putrefaction was noticeable, and the blood gave all of the reactions of fresh blood. The author, therefore, thinks that ether would be a better preservative agent for serum liquids than is carbolic acid or camphor; he thinks that the addition of 2 per cent. of ether could in noway produce coagulation in the blood vessels or give rise to symptoms of intoxication.

Hydrogen Peroxide as a Test for Blood.—Kastenbine (Odontogr. Jour., xvi., 233), recommends the employment of hydrogen peroxide, together with tincture of guaiac for detecting blood stains. To a stain supposed to be caused by blood, even if only of a slight straw color, apply a few drops of tincture of guaiac. No coloration will occur. Then add a few drops of hydrogen peroxide—instantly the spot turns to a deep azure blue, if blood is present.

Hæmin Crystals from Blood Stains Mixed with Rust.—J. Becker finds that iron rust may be regarded as a preservative of hæmatin, and that it is only necessary to select a proper solvent for the latter, which will not act on the former. This solvent he finds in ammonium chloride. The following is his procedure: Place a portion of the suspected rust in a test-tube, add a little powdered ammonium chloride, and pour over it a strong solution of ammonia; the test-tube is then corked and shaken at frequent intervals. After a few hours, the whole is filtered, to separate the rust, the filtrate being

of a clear amber color. A small quantity of this filtrate is placed on a slide with a particle of sodium chloride, and evaporated to dryness by gentle heat, a cover-glass put on, glacial acetic acid introduced beneath, again gently heated, and allowed to cool. Examine with a 1/6 in. objective and polarizing apparatus.

Instead of ammonium chloride, sodium chloride may be used; the filtrate then obtained is of darker amber color. It is only necessary to evaporate a drop of this carefully; cover with a cover-glass, and proceed as before. The crystals thus obtained are much larger and more easily distinguished.—Brit. Med. Jour., No. 1729, 351.

Detection of Blood Spots.—Micke and Wimmer recommend the observation of the absorption spectrum of oxyhæmoglobin in the following manner: Some particles of a spot occurring on iron are placed on a port-object, touched with a small drop of water, and heated for a short time to about 30°, replacing the water as it evaporates. If the spot was old and dried up in a thin layer, the chief part of the coloring-matter of the blood is oxidized to methæmoglobin. In order to reconvert it into oxyhæmoglobin they add to the solution on the port-object a trace of a solution of tartaric acid, ferrous sulphate, and excess of ammonia, by means of a glass rod drawn out to a fine point. Along with the drop they lay on the port-object a horse-hair, and over all a covering glass. By cautiously raising the superimposed corner the drop of liquid is moved to the middle of the covering glass, under which a second horse-hair is pushed. The drop now forms a minute column between the port-object and the covering glass, the depth of which needs to be merely 1 Mm. in order to obtain an observation of the absorption spectrum. In this manner we may operate with 0.5 cubic millimetre, or only 0.0005 Gm. of liquid. If no micro-spectrum apparatus is available, the edges of the covering glass are fixed to the port-object with melted wax or paraffin, the eye-piece and the illuminating arrangement are removed, and the microscope is placed in a horizontal position. The spectroscope is set in front of the microscope in such a manner that the tube of the latter lies in a straight line with the slit tube of the former, the object is illuminated in a suitable manner and the absorption spectrum examined.—Chem. News, 1895, 238.

Origin and Nature of Cancer.—Duplay expressed the opinion, at the international congress held in Budapest, that, judging from recent microscopical and experimental work, the etiology of cancer still remains unsolved. In his opinion, the theory of the existence of sporozoa in cancer, which by some is accepted quite readily, he thinks to be more and more doubtful as the research is pushed further, and it is necessary, since the usual histological methods of fixing and staining have not given satisfactory results, to resort to new methods—in particular, close attention should be given to the examination of fresh tissues. Recent experience is believed by Duplay to point strongly to the view that cancer

in an individual of one species cannot be communicated by inoculation to an individual of another species, and that within the same species it can be transmitted from one individual to another only under very exceptional conditions, not yet understood, though hereditary predisposition, perhaps, plays a certain part. According to the observation of Yorok, he is satisfied that the bodies regarded as psorosperms in cancer are nuclei, nucleoli, epithelial, or migratory cells, red blood-cells or products of degeneration. —Pharm. Era, 1895, 333 (Compare Proc., 1893).

Sparteine in Chloroform Narcosis.—Langlois and Mourange ("Therap. Blaetter,"1894; No. 12) report that experiments have demonstrated that sparteine, associated with morphine, is a powerful stimulant to the heart during chloroform narcosis. A dose of 3 to 4 Cgm., combined with 1 Cgm. of morphine, was injected hypodermatically 15 minutes before the administration of chloroform in various lengthy surgical operations—such as laparotomy, etc.; in 120 observations made, the heart continued to act strongly and in a perfectly regular manner during the chloroform narcosis. —Merck's Market Report.

Levulose in Diabetes.—J. B. Haycraft.—Patients with chronic diabetes can burn off 50 Gm. of levulose per diem. In some acute cases, a part of the levulose given is burnt off, a part is changed into dextrose, and a third part passes as such into the urine. Rabbits can make glycogen from levulose, the glycogen so formed accumulating in the liver.—Zeit. f. physiol. Chem., 1894, 137.

Bread Substitute for Diabetics.—R. T. Williamson has had prepared a bread substitute for diabetic patients, consisting of cakes prepared from aleuronal and cocoanut powder. Aleuronal is a yellowish powder, containing 80 to 90 per cent. of vegetable albumin and only 7 per cent. of carbohydrates. To make it into cakes, 2 oz. of desiccated cocoanut powder is mixed with a little water, containing a small quantity of German yeast, into a paste which is kept for an hour in a warm place. The sugar in the cocoanut is decomposed by fermentation, and the paste becomes spongy. Two ounces of aleuronal with saccharin are now added, and the whole is well mixed into dough, which is divided into cakes, and baked in a moderate oven for 20 to 30 minutes. If desiccated cocoanut powder be obtained free from sugar, it is then only necessary to mix the whole of the ingredients at once without the intervention of yeast. The cakes are most palatable when newly made, and are improved by being buttered.—Brit. Med. Journ., 1791, 922.

The Diazo Reaction as a Diagnosis of Disease.—The two following solutions are made up:

I.

Sulphanilic acid	5
Muriatic acid	50
Water	1000

II.

Sodium Nitrite	5
Water	100

Take 50 C.c. of solution I. and 1 C.c. of solution II., and mix with 50 C.c. of urine from the patient; ¼ C.c. of NH_3 solution is added, and the whole well shaken. In cases of typhus and several other fevers, a red color, due to the diazo reaction, is formed, and colors the separated scum deeply.—Apoth. Zeit.; Brit. and Col. Drug., 1894.

The Influence of Alum on Digestion.—It is generally believed that aluminum compounds, which have been used extensively in the adulteration of flour, and in baking powders, both impede digestion and have an injurious effect on the digestive organs. In a recent series of experiments by Bigelow and Hamilton (Jour. of the Amer. Chem. Soc.), the influence of these compounds was studied, not only upon the digestive action of pepsin and hydrochloric acid, but also upon artificial digestion in the pancreatic juice. Alum interfered materially with the action of the gastric juice, but the pancreatic juice effected the digestion of the remaining portion of food, which should have been digested by the pepsin. The same was true of the digestion of matters containing aluminum hydroxide. The action of aluminum phosphate was quite different, however, for notwithstanding the supposed insolubility of this compound, 10 or 12 per cent. of the albuminoids which were digestible in the presence of alum or aluminum hydroxide appeared to be insoluble in the presence of an equivalent amount of the phosphate.—Pharm. Era, 1895, 363.

Combination of Drugs.—Hildebrandt (Centralbl. f. inn. Med., January 12, 1895,) draws attention to the recent researches made into the elimination of certain undesirable by-effects of certain drugs by means of combination with other drugs. Sparteine has lately been recommended before the administration of chloroform, on account of its action on the heart and vagus. The intensifying action of one drug upon another has hardly been experimentally investigated. The combination of alcohol, menthol, toluol and ferric perchloride recommended by Lœffler in the local treatment of diphtheria (Epitome, November 10, 1894, par. 363) is an example of this intensifying action. In the treatment of neuralgia the combination of phenacetin and caffeine has been suggested. Phenacetin, salol and caffeine have been used with success in sciatica and trigeminal neuralgia. Migrainin consists of a combination of antipyrine and caffeine, a little citric acid being added. The author has made experiments to ascertain whether the value of combination lies in the increased activity of the principal drug in question. The author found by exact experiments that caffeine increases the specific action of antipyrine, but he could not prove that an entirely insufficient dose of antipyrine could be made efficient by the addition of caffeine. The action of quinine sulphate was also

shown to be increased by caffeine. By adding caffeine the effect of phenacetin was increased 20 per cent. As regards the allied hypnotics, caffeine was found to delay and diminish the action of chloral, but with trional no such effect was noted. It has been said that strychnine is no antagonist to the sulphonal group, as it is to chloral. The author shows that reflex action is not increased by strychnine in deep chloral narcosis, as it is in trional narcosis. He has noted that usually the effect of chloral was somewhat delayed by strychnine, whereas that of trional was not inconsiderably increased and hastened.

Surgical Dressings.—Ed. White (Chem. and Drug., 1894, 771) considers those dressings which he handled in his daily work. He then enumerates the chief materials used as a base in dressings, such as gauze worked up into several forms, wood products, and paper pulp. The object of these was to absorb the discharge from the wounds.

ASEPTIC DRESSING.

This was one of the two principal forms of dressing. The material was first cut up or prepared in a suitable form, then put in a jar, the lid of this removed, and the jar and lid put in a sterilizer and exposed to steam heat exerting a pressure of 15 lbs. to the square inch. The jar was then covered with cotton-wool, previously sterilized, and the lid replaced and sealed. When the jar was opened the dressing was removed by sterilized tongs and touched by no hands but those of the surgeon using it.

ANTISEPTIC DRESSING

was prepared by impregnating the material with various antiseptics, the chief being perchloride of mercury, carbolic acid, and double cyanide of mercury and zinc. The last-named was the most generally used, the material impregnated with it being usually colored with magenta. Carbolic dressing was now generally stiffened with resin, which was supposed to retain the acid better in it.

MATERIALS.

Muslin should be selected so that in tearing it none of the cross fibres drew out. Flannelette and flannel were also commonly used. Nearly all the lint used now was cotton lint. In surgery it was chiefly used not for actual wounds, but for application of oils, etc., to surfaces. Absorbent wool, some thought, might be too absorbent. It was said that if largely absorbent, the layer next the skin took up the moisture very quickly and became hard. Marine sponges were once used, but owing to the difficulty in cleaning these, and the expense of always using fresh, an artificial "sponge" was made with a ball of cotton-wool wrapped in gauze. It was, of course, necessary to avoid saturating dressings intended to be absorbent with the antiseptic. The latter must be distributed in the gauze with

little moistening. After showing and making some remarks on wood wool and paper pulp, he passed on to

METHOD OF IMPREGNATION.

Dip a known weight of gauze in water, wring out and weigh. The increase gives the amount of antiseptic solution wanted. Dip the gauze in this, and dry. If iodoform dressing is wanting, dissolve a known weight of iodoform in ether or spirits, and proceed as before with a known weight of gauze.

LIGATURES AND SUTURES.

The most important was catgut. The chief advantage of it was the readiness with which it was absorbed into the tissues. It must be sterilized without being destroyed, so that heat could not be used. One method was to soak in a solution of $HgCl_2$, let stand a week or so, then keep in plain ether or in absolute alcohol. Silk was stronger, and so used for big tight stitches. Silver wire had, of course, to be withdrawn when the wound was healed. Hair was also a strong material. Silkworm gut, said to be prepared by nipping the worm in the middle and drawing out, was a fifth material, and the tendons of kangaroo tail, a sixth, was probably the strongest ligament of its size.

PROTECTIVE DRESSINGS.

The best known of these were oiled silk, used in water dressing; jaconet, a kind of muslin waterproofed on one side; oiled paper, paper with boiled linseed oil brushed over; and "protective gauze tissue," really a dextrin gauze.

Sawdust Absorbent Dressings.—A. Neve strongly recommends the use of sawdust pads as a staple surgical dressing material. The sawdust is packed in muslin bags, and the pads are readily rendered either aseptic or antiseptic. In practice they are impregnated the day before use with a 1-in-2000 solution of mercuric zinc cyanide, or sterilized in a Cathcart's or Schimmelbusch's oven.—Bull. Pharm., 1894, 269.

The Meaning of Percentage as Applied to Antiseptic Surgical Dressing.—S. W. Williams has secured expressions from a number of authorities. Charles Rice formulates a rule as follows: "The percentage strength of a prepared medicated dressing refers to, or expresses, the weight of the medicinal agent in 100 parts of the finished product calculated as being dry, or as having been dried as far as possible—that is, free, or assumed to have been freed, from water, alcohol and other volatile solvents."—Amer. Drug. and Pharm. Record, 1895, 305.

Assay of Surgical Dressings—C. E. Parker enumerates the methods for estimating the iodoform as such, or by decomposing the iodoform and estimating the amount of iodine yielded therefrom. He illustrates a distil-

lation apparatus for distilling the iodoform and steam. It consists of a flask for generating steam, in the neck of which is placed the gauze in a distilling tube, which is connected with an ordinary condenser. A tared filter collects the product, which is then dried and weighed.—Drug. Circ., 1894, 245.

Assay of Carbolic Dressings.—C. E. Parker proceeds in the same manner as above given, and then assays the distillate.—Ibid., 1895, 4.

Assay of Mercury Bichloride Dressings.—C. E. Parker gives Denner's process as modified by Link and Voswinkle and also Beckurts' process. The first of these processes is direct, and has given good results in the writer's practice with the usual strengths of sublimate dressings. With anything weaker than 1 to 1000 difficulties might arise, but experience shows that many of these weak dressings are only ostensibly so, assaying much higher than the label indicates.—Ibid., 123.

Acetanilid as a Surgical Dressing.—S. K. Morton (Ibid., 88) says that acetanilid used in all operation wounds, including amputations, as a dusting powder, promoted healing without suppuration. Its effect was to thoroughly dry the wound, so that the usual drainage tube was not necessary. In cases of scalds and burns, it dries and soothes the affected surface, allowing healing to take place rapidly. As a dressing to chronic sores and ulcers it proved superior to other dressings. But two cases of constitutional effects were observed, one in his own practice and one reported by a surgeon in California; and, in both, the powder was applied over a large area in cases of extensive burns. Neither case was fatal.

Alimentary Enemata of Emulsified Oil.—The ingestion of cod liver oil is often repugnant to patients, and gives rise to digestive disturbances necessitating its suspension. Revilliod's experience (La Sem. Méd.) in administering oily substances per rectum is reported to have been satisfactory. Zoppino ascertained that the oil thus injected is absorbed by the intestines, the body weight gradually increasing and the general condition improving. He used the following preparations:

1.	Cod liver oil	600 Gm.
	Yolk of two eggs	
	Lime water	400 Gm.

To this emulsion 0.7 per cent. of sodium chloride may be added to diminish the irritability of the rectal mucous membrane.

2.	Cod liver oil	100 Gm.
	Yolk of four eggs	
	Sodium chloride	7 "
	Water	35 "

3. Cod liver oil ..... 600 "
Tragacanth ..... 2.5 "
Acacia ..... 50 "
Calcium hypophosphite ..... 2.5 "
Lime water ..... enough for 1 liter

The author employed also a pancreatico-biliary emulsion, prepared as follows:

Mince a hog's pancreas until it is like pap. Add 20 C.c. of distilled water, triturate the mixture well, express the liquid, and mix with 5 liters of cod liver oil. Now mix 200 C.c. of hog bile, with 50 C.c. of 10 per cent. hydrochloric acid. This will precipitate the biliary mucus, part of which will be deposited in a firm mass at the bottom of the vessel, while a part remains suspended in the liquid, which assumes a yellow tint. Only the latter mucus is utilized for the emulsion. Two hundred and ten C.c. of liquid are thus obtained (the quantity of the deposited mass amounting to 40 Gm.), and this is mixed with 5 liters of pancreatic oil. It suffices to agitate this mixture to obtain a perfect emulsion containing relatively more oil than those described above and apparently more completely absorbable. Certain medicamentous substances (as creosote, hypophosphites, etc.), may be readily incorporated with it.

The cod liver oil in the preceding formulas may, without inconvenience, be replaced by sweet almond oil, which, it is stated, is absorbed quite as well.

The non-emulsified cod liver oil or sweet almond oil enemata merely bring on purgation and do not increase the body weight—that is, they are not absorbed.

The alimentary oily enema is best given at bedtime after the usual stool; or, in case of constipation a few hours after an evacuating enema. The syringe used should have a capacity of 150 C.c., and be provided with a soft catheter. This is gently introduced into the rectum to a depth of at least 15 Cm., with the patient lying on his side, and after the injection changing to a dorsal position, which is maintained until the peculiar sensation produced by the entrance of the oil into the intestine has completely disappeared.

The quantity of injected oil should in the beginning be 60–70 Gm. The doses should then be gradually increased to 100, 150 and sometimes to 200 Gm.

These enemata are generally well supported, it is stated; if not, a few drops of laudanum are added.

The patient should retain the enema all night, that is to say, he must not go to stool before the lapse of 12 hours, during which time a great portion of the oil is absorbed, so that none or but little of it is found in the stool first following.

The favorable action of these enemata on nutrition was demonstrated by

eighteen observations of the author in emaciated patients afflicted with neurasthenia, nephritis, pulmonary tuberculosis, carcinoma, or affections of the digestive tract. In all there was a progressive increase of the body weight, attaining sometimes several kilograms in a few weeks. The increase, particularly rapid in the beginning of the treatment, gradually diminishes; at times it exceeded the quantity of injected oil.—Amer. Drug. and Pharm. Rec., 1894.

Fat in the Sweat Glands.—In a paper on the function of the sweat-glands in man, P. G. Unna gives a summary of the researches on this subject, and devotes special attention to the secretion of fat. He is of opinion that it is irrefutable that the ordinary sweat-glands in man secrete fat, and shows that this can readily be proved by treating sections of skin or the sweat of the hand with osmic acid. The fat, though similar to that of the sebaceous glands, is described as differing from it in the same way that stearic and margaric acids differ from oleic acid.—Brit. Journ. Dermatology, vi., 257.

Bengal Hæmostatic Plants.—G. C. Bagchu showed a decided inclination to the Hindu system of medicine, "flowers boiled in milk" being one of the forms recommended by this practitioner. The plants recommeded were Saraca indica, a leguminous plant known as Asok, Eupatorium Ayapana (Ayapana in the vernacular), which was used in the form of a paste of the powdered leaves applied to wounds; the freshly expressed juice of Blumea densiflora (Kuksurgh in Bengali), which was useful in hæmorrhage from the bowels due to dysentery or other causes; and the flowers of the red lotus (Nymphæa rubra), which were recommended for arresting hæmorrhage from the uterus. The doctor somewhat vaguely stated that the hæmostatic influence of the Blumea leaves "was due to the presence of a volatile oil."—Chem. Drug., 1895, 44.

Oil of Turpentine as a Hæmostatic.—The hæmostatic property of oil of turpentine has been known for some time, but not utilized as it deserves. According to J. Sasse (Therap. Monatsh., 1895, 83), excessive bleeding, caused by extraction of teeth, can quickly be stopped by the application of a piece of cotton saturated with oil of turpentine, even when all other methods fail. Sasse has furthermore found this oil of great service in hæmaturia, in which complaint he gives it in the form of a 1 : 200 emulsion, of which one tablespoonful is given every hour. The author states that Gobee had a case of acute nephritis, in which he succeeded in arresting the presence of blood in the urine by means of oil of turpentine, after other remedies had been tried in vain.

Thymus Gland Secretion as a Hæmostatic.—Wright finds that the following preparation of thymus gland of the calf is powerfully hæmostatic. One calf's sweetbread is cut into small pieces, and macerated for 24 or 36 hours, with frequent shaking in the following menstruum: Sodium car-

bonate, 3 to 6 parts ; chloroform, 15 parts ; distilled water, 300 parts ; filter and add chlorinated lime, 30 parts. Again filter, and add finally sufficient caustic soda to produce a faintly alkaline reaction. Preserve in well-stoppered bottles. Wounds are simply touched with the liquid.—Revue de Therapeut., after Chem. Centr.

Lemon Juice as a Hæmostatic.—E. T. Burton (Wiener Med. Presse) records a case of copious hæmorrhage from both nares in a full-blooded young man, in which the bleeding was immediately stopped after an ordinary glass syringeful of a mixture of lemon juice and water (1 : 4) had been injected into the nose. In a case of hæmatemesis in which all ordinary remedies had failed, the hæmorrhage was instantly arrested by pure lemon juice ; it reoccurred, it is true, on the next day, but stayed away entirely on the re-employment of the remedy, so that the patient quickly recovered. Lemon juice has also been successful in a case of intestinal bleeding in typhoid fever.—Amer. Drug. and Pharm. Rec., 1894.

Fluid Extract of Capsella as a Hæmostatic.—The fluid extract of capsella, bursa-pastoris or shepherd's purse, is recommended (Anal. di Chim. e Farm.) as a hæmostatic in doses of 1½ to 2½ drops three times daily, replacing hydrastis.—Pharm. Centralh., 1894, 446.

Cure for Hiccough.—C. O. Leary (Bull. Pharm., 1894, 269) narrates a number of very severe cases of hiccough, and strongly recommends a mode of treatment for which he claims great efficacy. A quantity of ice is broken up and placed in a towel, forming an extemporized ice-bag, This is so applied to the spine as to extend from the neck to below the middle of the back.

Fumigating Powder.—The Drog. Zeit. ; Amer. Drug. and Pharm. Rec., 1895, 82, gives the following :

Potassium nitrate	2 parts.
Cascarilla bark, powdered	4 "
Benzoin, powdered	2 "
Cloves, powdered	1 "

New Mercurial Salt for Injection.—This is the double hyposulphite of mercury and potassium. Injections of this compound, according to Dreser and Camerer (Med. Bull.), are no more painful than ordinary injections of morphine. They produce no irritation or local caustic effect, and the dose may be exactly regulated, 1 Gm. of chloride of mercury corresponding to 2.32 Gm. of hyposulphite of mercury and potassium. The solution for injection is made in the proportion of 0.25 Gm. in 10 grams of distilled water. From 0.5 to 1 C.c. of the solution is injected, corresponding to about $\frac{1}{1\frac{1}{2}}$ to $\frac{1}{6}$ grain of corrosive sublimate.—Ibid., 1894.

Hypodermic Injection of Quinine.—H. Marty employs (Jour. Pharm. Chim., 1894, 51) the following formula:

Quinine monochloride	3 Gm.
Analgesine (Antipyrine)	2 Gm.
Distilled Water (boiled and cooled to 15° C.)	6 C.c.

Introduce into a flask and digest at 40° to 50° until solution is complete. The total volume is 10 C.c. at 15° and each C.c. contains 0.30 Gm. of quinine.

Insect Sting Remedy.—A paint for the stings of insects, in which ammonia is kept in close and prolonged contact with the affected part, is prescribed as follows:

℞. Aq. ammoniæ	℥ cl.
Collodion	gr. l.
Acid salicylici	gr. v.

A few drops to be applied to each bite or sting.—Medical Chronicle; Canad. Drug., 1895, 139.

Kola Phosphate.—In West. Drug., 1894, 457, we find the following:

Fld. ext. kola	fl. dr. 4.
Soluble essence of lemon	" 2.
Tinc. vanillin comp	" 3.
Sol. acid phosphate	fl. oz. 1.
Syrup	enough to make " 16.

Improved Method for Kumyss.—Bodo Lorenz claims that the following procedure for producing kumyss is not only reliable, but superior to that of the National Formulary or E. Dieterich. He says: "Mix 1 gallon of cow's milk with 1 pint of water containing in solution 4 drams of grape sugar, 2 drams of sodium bicarbonate, and 2 drams of beer-yeast; let the mixture stand in an open vessel (merely covered with a cloth) in a warm place, until the bubbles forming on the surface, in consequence of the fermentation, begin to disappear. Then put the milk into an ice box for over night or long enough to be completely cooled; then strain it through gauze, fill it in Apollinaris or magnesia bottles, securely cork the latter, again put them into the ice-box, and keep them there for three days, during which time they must be frequently shaken. The kumyss will then be ready for use, but should preferably be kept on ice for eight to ten days more.—Merck's Market Report; West. Drug., 1894, 419.

Influence of Sugar and of Smoking on Muscular Work.—By V. Harley (J. Physiol., 16, 97–122, and Proc. Roy. Soc., 54, 480). The experiments were performed with Mosso's ergograph, and show that the periods of digestion, as well as the kinds of food, have a marked influence on volun-

tary muscular energy; but, irrespective of this, there is a periodical diurnal rise and fall in the power of doing work, the minimum being about 9 a. m., the maximum about 3 p. m. Regular muscular exercise increases the size and the power of the muscles, and delays the onset of fatigue. The amount of work performed on sugar alone is almost equal to that obtained on a full diet, but fatigue comes on sooner. Sugar acts as a source of muscular energy when taken alone, or in addition to other articles of diet. Moderate smoking may have a slight influence in diminishing the power of doing muscular work, but it stops neither the morning rise nor the evening fall.

Palatable Cascara Compounds.—F. Edel gives the following formulas in Amer. Drug. and Pharm. Rec., 1894, 259:

I.

Fluid extract of cascara (bitterless)	3 ounces.
Fluid extract of senna	2 ounces.
Fluid extract of wahoo	1 ounce.
Liquid liquorice	2 ounces.
Saccharin	60 grains.
Aromatic elixir, enough to make	16 ounces.

The bitter taste of the wahoo is well concealed by this formula, and the elixir is miscible with water.

II.

Fluid extract of cascara (bitterless)	3 ounces.
Fluid extract of rhubarb	1½ ounces.
Fluid extract of senna	1½ ounces.
Liquid liquorice	2 ounces.
Saccharin	60 grains.
Aromatic elixir, enough to make	16 ounces.

Mix, and if necessary filter.

The bitterless extract of cascara is made as follows:

Cascara sagrada in coarse powder	16 oz.
Calcined magnesia	1½ oz.
Water	18 oz.
Alcohol	12 oz.
Dilute alcohol, a sufficiency.	
Glycerin	2 oz.

Make an intimate mixture of cascara and magnesia, moisten with water and macerate for several hours; then pack the mixture in a percolator and allow to macerate 48 hours; then add 12 ounces of alcohol and allow to macerate 12 hours longer. Start percolation, using dilute alcohol; reserve the first twelve ounces, and then continue percolation to exhaustion.

Recover the alcohol and evaporate to a soft extract and dissolve in the reserved portion, then add glycerin to make sixteen ounces.

The liquid liquorice used is made thus, being a modification of G. H. C. Klie's formula: Take stick extract of liquorice 16 ounces: break into small pieces and pack in a percolator, with alternate layers of rye straw, first a layer of straw and then one of liquorice, until the percolator is filled. Cork the percolator, fill with cool water and macerate for twenty-four hours; then remove the cork and allow the liquid to run off. Reserve this and keep it in a cool place. Place enough water in the percolator to cover the extract again, and allow to again stand for twelve hours, permitting the liquid to then run off as before. Mix the two liquids and evaporate on a water-bath until twelve fluid ounces remain. Then add two ounces of glycerin and two ounces of alcohol.

Aromatic Elixir of Kola.—F. Edel (Ibid., 365) gives the following:

Fld. extract of kola	℥ ij
Ammoniated glycyrrhizin	ʒ j
Saccharin	ʒ j
Water	fl. ℥ vij
Alcohol	fl. ℥ iiiss
Simple syrup	fl. ℥ iiiss

Dissolve the ammoniated glycyrrhizin in the water and in this dissolve the saccharin; now add the syrup and alcohol, followed by the fluid extract of kola, to which has been added a few drops of oil of orange. Set aside, with occasional shaking, during 5 or 6 hours; then filter and bring its bulk up to 1 pint with simple elixir.

Palatable Fld. Ext. of Buckthorn.—According to F. Edel (Ibid.), a very palatable fluid extract of buckthorn may be made after the following formula:

Fld. extract of buckthorn	Oj
Ammoniated glycyrrhizin	ʒ ij
Saccharin	ʒ j
Solution of potash	fl. ʒ ij
Water	fl. ℥ ij

Dissolve the saccharin and glycyrrhizin in the water to which has been added the solution of potash, the fluid extract of buckthorn, and mix thoroughly. The result is an elegant fluid extract, free from nauseating or disagreeable taste.

Gelatino-Plastics.—A. Dane (l'Union Pharm., Vol. xxxvi, p. 52) designates by this name a series of new preparations, having for a base glycerin, gelatin, and water, and moldable into any desired shape (suppository, nipple shield, plastic band, or ovule). The composition of the base is as follows:

White gelatin	3 parts.
Distilled water	120 parts.
Glycerin	10 parts.

Melt on the water-bath; after it has cooled add the medicament, and finally mold into the desired shape.

To make ovules, the mass is poured into oiled molds of half the size of the ovules; each half is then taken out, and, by dipping the flat ends into warm gelatin solution, they are made to adhere, forming a whole ovule. For suppositories, pour the melted mass into ordinary suppository molds, previously well oiled. To make glycero-gelatin nipple shields, pour the mass into molds, made for the purpose in the shape of nipple shields. This form is useful for the cracked nipples or other diseases of the nipples. For gelatino-plastics the melted mass is poured upon a flat, oiled surface.

The layer can be made of any thickness, according to the purpose it is intended to fulfill. In this form gelatino-plastics can be used as simple emollients, or can be made to carry medicaments (morphine, iodoform) to any desired part of the body. Gently heating one side of this plaster will cause it to adhere, and a simple bandage will still further hold it in place. The above preparations are said to melt slowly at the body temperature. The author has found them convenient for treating local ailments where cutaneous absorption of the active ingredients or a simple emollient is intended or indicated, respectively.

Proteid Poisons.—Proteid poisons have been obtained from both the vegetable and animal kingdoms. Thus, among those obtained from plants one may mention the proteids obtained from jequirity seeds, the proteid associated with or identical with the ferment papain of the papaw plant, and lupino-toxin from the yellow lupin.

The most important of the animal proteid poisons are snake poisons, the proteids in the serum of the conger eel and other fish, and proteid poisons found in certain spiders. Poisonous proteids are also formed during ordinary digestive processes in the alimentary canal of every one of us from the proteids taken in as food. The peptones and proteoses or albumenoses (intermediate products in the process of hydration of which the terminal product is peptone) are fairly powerful poisons. 0.3 Gm. per kilogramme of body weight injected into the blood will kill a dog, producing a loss of coagulability of the blood, a fall of blood pressure, a stoppage of secretions, and ultimately death by cessation of respiratory activity. Normally animals are protected from this poison by the lining membrane of the alimentary canal, so that no proteose or pep one is found in blood or lymph even during the most active periods of digestion. The cells of this membrane possess many remarkable properties, but one of the most important is its power of regenerating albumen from peptone.

Allied to the albumoses of ordinary gastric activity are the similar products produced by bacteria. The way in which bacteria produce disease has long been a matter of dispute, but the problem appears to be approaching solution. Pathologists have at last turned their attention to the chemical side of the question, and shown that whereas in some cases the poisons produced by the growth of micro-organisms are alkaloidal in nature, in by far the greater number the toxic product is a proteid. The one which is best known, or at least has attracted most attention, is the toxalbumose contained in Koch's tuberculin.

The foregoing list is far from complete, but one cannot conclude it without mentioning another class of proteid poisons. These are the nucleo-albumins obtainable by suitable methods from most of the cellular organs of the body. Originally discovered by Woolridge, they were named by him tissue-fibrinogens, because they possess the remarkable power of producing coagulation of the blood within the blood-vessels of a living animal. A very small dose will kill a rabbit or a dog, and death is as a rule produced by extensive clotting within the vessels, especially in the veins. Under certain conditions, however, especially in the dog, they produce the opposite result, namely, a loss of coagulability similar to that produced by peptone. Woolridge termed this the "negative phase of coagulation."

A practical outcome of all this work is the discovery of alexines or protective proteids. These appear to belong to the nucleo-albumin class also. In smaller doses they confer immunity on animals to larger doses of similar poisons, and thus the long hidden secret of the *modus operandi* of vaccination and other forms of protective inoculation is at last beginning to be unraveled.—Pharm. Jour. Trans., 1894, 376. Extracted from an article on "snake poison," by W. D. Halliburton, in Science Progress, Sept., 1894.

Wholesale Poisoning by Bread in Saxony.—The German newspapers report that no fewer than 150 persons have been taken seriously ill through eating breakfast rolls obtained from a bakery in the town, and a child has already died. The baker at whose establishment the rolls were baked and the members of his family are among the sufferers. It is stated that a chemical analysis of the rolls has established the presence of arsenic in them, but it is not yet decided whether this is due to carelessness or to criminal intention.—Brit. and Col. Drug., 1894, 653.

Carbonic Oxide Poisoning—G. Marthen.—Five cases of poisoning by carbonic oxide are given with clinical details. In all, the body temperature was elevated. As regards metabolism, the decomposition of proteïd is enormously increased. There may be slight albuminuria. The pulse is like that of typhoid fever. The red corpuscles of the blood are increased considerably.—Virchow's Archiv., 1894, 537; Jour. Chem. Soc., 1894, 360.

Antidote to Chloral Poisoning.—Dougall (Glasgow Med. Jour., Feb., 1895) says, assuming that a person has taken a poisonous dose of chloral —say 80 grains—and that there could with safety be given, as a chemical antidote, 27 grains of potash, this amount being the quantity by weight in the formula required to decompose 80 grains of chloral—in such a case, says the author, there are strong a priori grounds for assuming that in about 15 minutes the chloral in the system would be entirely changed into formate of potassium and chloroform, or, at least, that so much of it would be decomposed that the residue would be harmless. But would not the potash, he asks, or the amount of its formate, or of the chloroform thus produced, be as lethal as the chloral? Undoubtedly 27 grains of potash swallowed at once, even much diluted, would cause serious symptoms. But if even half that quantity was given in divided doses—say 7 grains every hour—in warm milk, gruel or barley water, it seems very probable that by this means no serious irritation of the gastro-intestinal tract would be the result, and that in a short time so much of the chloral would be decomposed as to render the rest at least non-lethal.

The liquor potassæ of the British Pharmacopœia contains about a grain of potash in 16 minims, and the maximum dose stated is 60 minims, Hence, the author says, to give 7 grains of potash is equal to giving 112 minims of liquor potassæ. He thinks it may be assumed that this quantity, highly diluted, might be given without fear of causing unfavorable symptoms. By this means 20 grains of the chloral would soon be decomposed, thereby neutralizing its lethal power to a certain degree, if the potash is given before the patient is too far gone to be afforded relief by this means; then, if in an hour after a similar dose of potash is given in the same way, this would reduce the chloral in the system to 40 grains, a quantity quite within the bounds of safety for an adult, provided there is no heart trouble.

Dougall says that he has proved by experiment what has been stated by others—namely, that the carbonates and bicarbonates of potassium and of sodium also decompose chloral; but their action, particularly that of the bicarbonates, is very slow, and, besides, a much larger quantity than of potash is required, also a heat much above that of the body. With regard to the action of formate of potassium, it merely causes a peculiar eruption of the skin, which soon disappears when the use of the drug is stopped. This eruption is well known to habitual chloral-takers, and seems to prove that chloral is decomposed in the blood as stated.

With regard to the probable effects of the chloroform which would be generated by the decomposition of 40 grains of chloral, the author finds that this quantity of chloral requires 13.5 grains of potash for its decomposition, which results in the production of 28.5 grains of chloroform, equal to 21.5 minims. As much larger amounts of chloroform (from ½ ounce to 4 ounces) have been swallowed and recovery has followed, and

as it is likely that the greater part of that which is generated in the blood by the decomposition of the chloral is exhaled as fast as it is produced, Dougall thinks that nothing serious need be feared on this point.—Amer. Drug. and Pharm. Record, 1895, 173.

Creosote Poisoning by the Therapeutic Dose.—A fatal case of creosote poisoning by the therapeutic dose is reported by Zanalski (Cent. f. inn. med.), the result being attributed to the use of milk as a vehicle. The drug was prescribed for a female patient, who took three 6-drop doses in twenty-four hours. Soon after the third dose she exhibited symptoms of of intense gastro-intestinal irritation, accompanied by anesthesia and partial paralysis of the soft palate and vocal cords, and, moreover, presented erosions of the buccal and pharyngeal mucous membrane, albuminuria and signs of heart failure; her breath had a strong odor of creosote. She died in a week. The necropsy revealed extensive bloody suffusion of the stomach and intestines and ulcerations of the esophagus and of the pylorus, fatty degeneration of the liver, acute nephritis and hyperemia of the brain. Zanalski thinks the poisoning was due to the mode of administration; creosote is insoluble in milk, and acts as though given alone. He asserts that no other case of idiosyncrasy for the drug has been observed, but advises to begin its exhibition with doses of one or two drops, and proceed to larger doses with caution.—Drug. Circ., 1895, 106.

Salamanders Immune Against Curare.—According to Cl. Bernard, most animals are sensitive to the action of curare. But there is one that is refractory to this poison. Phisalix and Contejean have established the fact that the salamander resists doses of it that would kill more than eighty frogs. These experimenters have investigated the cause of this remarkable immunity, and have recognized that it is due to the presence in the blood of the salamander of a substance which is a physiological antidote to curare. In order to prove it, they inoculated a frog with the blood of the salamander, mixed with curare; or, rather, after having previously inoculated the frog with the blood of the salamander, they injected a solution of curare. The frog resisted doses of the curare that were four or six times mortal. It is evident that these experiments afforded additional support to the method of serum therapy, and fully authorize all trials in this direction.—Pharm. Era, 1895, 135.

Ether as an Intoxicant.—The Lyon Médical states that the habit of getting drunk on ether, which originally came from England, has existed in France the last five or six years. The number of persons addicted to this form of debauchery seems to be growing greater, and cases are not uncommon in which persons drunk with ether are arrested in the streets.—Brit. and Col. Drug., 1894, 522.

Poisoning by Exalgine.—Reports are given of a case of poisoning by

5 grains of exalgine, administered to a woman suffering from severe asthma and consequent insomnia. The effects were experienced within five minutes, the patient becoming perfectly stiff and unconscious. Recovery was effected with considerable difficulty, and attention is drawn to the evident danger of administering exalgine—a respiratory poison —to asthmatics even in moderate doses.—Pharm. Jour. Trans., 1895, 1109.

Poisoning by Ferrocyanide.—Finck records a case of poisoning by ferrocyanide of potassium. A day laborer who had swallowed a quantity of the salt was found in a semi-comatose state. On complaining of thirst he was given vinegar to drink, and soon afterwards died. It would appear, therefore, that the acids present in the stomach were sufficient to liberate small quantities of hydrocyanic acid, and that the reaction was accelerated by the vinegar.—Forchungs Berichte, ii., 148; Pharm. Jour. Trans., 1895, 1196.

Cobalt Nitrate and Hydrocyanic Acid.—Antal recommends cobalt nitrate as an antidote to poisoning by hydrocyanic acid, in the form of a ½ to 1 per cent. solution in water. It is claimed that the above antidote will counteract the poisonous effect of hydrocyanic acid in the stomach or after it has entered the circulation.

In cases of poisoning the antidote should be injected hypodermically and given in tumblerful doses per os. It is claimed that the antidote, even if given in large doses, may be safely administered.—Zeitschr. Oest. Apoth. Ver., 1894, 392.

Leeches and Hydrocyanic Acid.—Leeches are said to be proof against prussic acid. They may also be fed on cantharides without being inconvenienced.—Brit. and Col. Drug., 1894, 445.

Poisoned by Laburnum Seeds.—Two boys of about eight years of age were seized with sudden illness. Questioned by their parents, the boys stated that they had eaten beans which they had pulled off a laburnum tree. Medical aid was obtained, and emetics promptly applied, and the boys recovered.—Ibid., 198.

An Uncommon Source of Lead Poisoning.—A series of cases of lead poisoning in a family have been traced by H. Strauss to the material used in stopping the millstones in which the flour for the bread of the household was ground. The stopping contained a very large quantity of sugar of lead. Strauss states that a more extensive epidemic of lead poisoning at Chartres about 30 years ago was also traced to the use of a stopping for millstones which contained a large quantity of lead.—Ibid., 270.

Methylated Spirit and Eau de Cologne Drinking.—The British Medical Journal states that an inquiry in the east end of London has revealed that a considerable amount of S. V. M. is drunk mixed with lemon juice. It is said that a number of chemists in the district have agreed not to sell the

articles on Saturday evening. The same journal also draws attention to what it states is a growing custom among women—the drinking of Eau de Cologne as a beverage.—Ibid., 329.

Morphia and Fowls.—E. White writes to the Lancet that morphia is non-poisonous to fowls. At the request of a lady patient who wished to destroy some pet fowls, he gave them—six hens and a cock—one dram of acetate of morphia in bread and milk sop, the whole of which they swallowed with avidity. Two days later the birds were alive and strong.—Ibid., 571.

Strychnine in Mushroom Poisoning.—Konigsdorfer (Giorn. di Farm. et di Chim.) has obtained wonderful results in cases of mushroom poisoning from subcutaneous injections of strychnine (0.001 to the amount of 0.012). Recovery was sometimes instantaneous, "as if by magic."—Ibid., 324.

Poisoning by Nutmegs.—T. G. Simpson (Lancet, Jan. 19, 1895), relates the following case: On December 9 his assistant was called to see a woman, twenty-six years old. He found her lying on the bed in a drowsy condition and very delirious. There were fairly lucid intervals, when she complained of a sensation of great tightness across the chest, and of vertigo and faintness when attempting to rise. She vomited several times; pulse was seventy-five a minute and rather feeble; the heart's action also was feeble; the pupils were normal. It was ascertained upon making inquiries that the patient, who was a strong, healthy woman, had taken two nutmegs crushed in a small quantity of gin, as she had gone over the menstrual period for a week. The assistant directed her to remain in bed and to take a little strong coffee with a dessert-spoonful of brandy in it every half hour. He also prescribed a mixture of potassium bromide, ammonium carbonate, sodium bicarbonate, spirit of cajuput, and chloroform water (quantities not stated). The author himself saw the patient a few hours later and found her condition improved, but still showing the same symptoms. He continued the treatment, and the next day she was very much better, although there was a little vertigo, and she was very weak. The coffee and brandy were given up, but the medicine was continued, and on the following day she was able to get up. Since then recovery had progressed favorably. The author adds that the nutmegs had no effect whatever in producing miscarriage.—Amer. Drug. and Pharm. Rec., 1895, 144.

Permanganate as an Antidote to Opium.—J. Carpenter has previously testified to the extreme value of the administration of permanganate in cases of opium poisoning, and now records another case in which recovery of an apparently moribund patient was brought about by this antidote. The case was that of an infant in a state of profound opium narcosis, due to an overdose of "soothing" syrup. After failing to produce any alleviation of the symptoms by four hours' active treatment, as a last resource 5 minims

of saturated solution of permanganate of potassium was injected into the thigh. In an incredibly short time all the alarming symptoms subsided, respiration improved, and consciousness quickly returned. — Therap. Gazette, Mar. 15, 1895; Pharm. Jour. Trans., 1895, 961.

Potassium Permanganate in Phosphorus Poisoning.—Kelemen (Med. Week., 1894, II, p. 540) reports a case of phosphorus poisoning successfully treated with potassium permanganate. When he saw the patient, about 2½ hours after ingestion of the poison, she was very pale and complained of intense pain in the epigastric region; the pulse was rapid. He first administered copper sulphate as an emetic, and then freely gave a 1 : 1,000 solution of potassium permanganate. The patient took 1 liter and a half of the latter within two hours, and another half-liter within the course of the day. The next day she was better, although she still experienced acute pains in the stomach and had vomited three times. She drank another liter of the permanganate solution. On the fourth day the pain and vomiting ceased; the patient rapidly improved, and in a few weeks she had completely recovered.

Potassium Permanganate in Phosphorus Poisoning.—Antal was the man who first suggested the use of potassium permanganate for phosphorus poisoning.—Rep. de Pharm., 1894; Brit. and Col. Drug., 1894, 261.

Poisoning by Pyrogallol and its Detection.—D. Vitali.—Death resulted from the administration of 0.20 Gm. of pyrogallol, in several doses, to a dog weighing 8 kilos. The phenol can be detected in the urine after the first dose, but not after subsequent doses, its oxidation products only being then found.—L'Orosi, 1894, 37; Jour. Chem. Soc., 1894, 327.

Strychnine in Snake Bite.—The fallacy in the employment of strychnine as an antidote to snake poisoning has been fully established by Elliot, who reported the results of his experiments before the South Indian branch of the British Medical Association. He and all those who spoke at the discussion of the paper agreed that strychnine was calculated to be extremely dangerous, and only to add further agony to the unfortunate patient without affording any relief.—B. M. J., April 20, 1895.

Employment of the Modus Operandi of Chloride of Lime Against the Bite of Venomous Serpents.—C. Phisalix and G. Bertrand.—All the experiments of the authors concur in demonstrating that the solution of chloride of lime, advocated against the bite of venomous serpents, has only a local action. It destroys the venom and modifies the tissues, thus obstructing the absorption of the toxic matter. Injections of chloride of lime made at other points than that of the bite have no immunizing power, and must be avoided. It is necessary to inject deeply at the very part where the fangs have penetrated.—Compt. rend., 1895, No. 23.

Strychnine a Cumulative Poison.—Everything in the way of evidence

goes to prove that strychnine, diffused through the tissues, undergoes no change. It is diffused widely through the tissues, and, so diffused, it causes the most determined effects ; it leads the muscles to assume tetanic contractions, attended with intense pain. It does not touch, apparently, the sensory system at all, but it strongly excites the motor nerves, or it acts directly on the muscular fibre, we know not correctly which, but it undergoes no change in itself. It remains in the body unaffected in composition, and it even resists in the dead body the process of the decomposition of tissue. It happened once, in the course of a great trial, that the remains of a dog that had been poisoned by strychnine were extracted from the earth after burial for three years, and were examined by another observer and the author for strychnine. They found in this debris the evidence of strychnine, as if the animal had not been dead an hour. The strychnine had produced all its fatal effects by its presence, remaining itself intact. It would be possible to extend these comparisons to atropia, to cannabina, and to the majority of the organic substances which are employed in medical practice, when they are stripped of their extraneous surroundings ; but the illustrations given are all sufficient to make obvious what may be called physiological modification, or more properly, perhaps, physiological catalysis.—W. B. Richardson, in the Hospital, Amer. Drug. and Pharm. Rec., 1894.

Poisoning by Strychnine.—A case is reported in the Indian Medical Reporter, in which a Hindoo woman took 10 grains of strychnine hydrochlorate as a poison. Her stomach was vigorously washed out with solution of permanganate of potash, and repeated injections of chloral and potassium bromide were given per rectum. She recovered, having taken 220 grains of chloral and 240 grains of the bromide.—Brit. and Col. Drug. ; Alumni Jour., 1895, 76.

Butyl-Chloral as an Antidote to Strychnine.—Grigorescu (Arch. de Physiol.), in the course of some experiment to determine the action of toxic substances upon the excitability of peripheral nerves and muscles, developed the fact that butyl-chloral opposes the toxic action of strychnine. He found that if injections of strychnine were made (in frogs), those which received also the butyl-chloral remained torpid, while those with strychnine alone were tetanized ; the least noise increased the tetanus of the latter, but the former did not show any spasm. After some hours the butyl-chloral was eliminated, and then these frogs were seized with tetanus like the others. On repeating the antidote up to the elimination of the strychnine, complete cures resulted. On experimenting with larger frogs, similar results were obtained. The observations demonstrate that butyl-chloral energetically opposes its physiological action to the physiological action of strychnine.—Drug. Cir. and Bull. Pharm., 1894, 466.

Poisoning in the Punjaub.—From a return issued by the analyst to the

Punjaub Government, it appears that during 1893, 498 cases of poisoning (human beings) were under his notice, and the poison was identified in 78.88 per cent. of the cases. The poisons used most frequently were opium, arsenic, and datura, and of the cases where the poison was identified, opium claimed 50.8 per cent., arsenic 37.2, and datura 4.4 per cent. opium being used chiefly for suicide, and the two latter agents for homicide. There were 238 cases of cattle poisoning submitted for examination, with the result that the poison was detected in 73.5 per cent. of the cases, arsenic being employed in 92.52 per cent. of the cases in which the agent was detected. There were 32 cases of cattle poisoning by means of wooden needles smeared with a paste composed of the powdered seeds of the *Abrus precatorius*. One case of human poisoning by this means was submitted. From the vicinity of the puncture an alkaloid was extracted, which, injected under the skin of a frog, caused its death in 15 minutes.—Brit. and Col. Drug., 1895, 77.

Suicidal Deaths in Scotland from Poison.—A record of ten years, from 1881 to 1890 (inclusive,) in Brit. and Col. Drug., 1895, 293:

Poison.	M.	F.	Poison.	M.	F.
Acetic Acid	1		Hydrochloric Acid	1	1
Aconite	1	1	Nitrate of Potash	....	1
Ammonia	....	1	Nitric Acid	1	1
Antimony	1		Opium, Morphia	73	32
Arsenic	4	3	Oxalic Acid	1	8
Carbolic Acid	9	7	Phosphorus	1	4
Chloral Hydrate	3	3	Prussic Acid	9	2
Chloride of Lime	....	1	Salts of Sorrel	....	7
Chlorodyne	1		Strychnia	2	4
Chloroform	2	1	Sulphuric Acid	....	4
Corrosive Sublimate	1	1	Others, or not stated	17	16
Cyanide of Potassium	5				

An Effervescent Purgative Lemonade.—The Journal des Praticiens for May 30, publishes the following formula, by C. Paul, who recommends it on account of its rapid action (in two or three hours) and its being tolerated: Sodium phosphate, 375 grains; distilled water, 8 ounces; syrup, 1 ounce; tincture of lemon, 25 drops; citric acid and sodium bicarbonate, each, half a drachm.—Amer. Drug. and Pharm. Rec., 1894.

Depilatory Soap, recently patented by J. Mellinger, is made from: Glycerin, 1 lb.; tallow, 2 lbs.; cocoanut oil, 2 lbs.; castor oil, 4 lbs., solution soda (25 per cent.) 4 lbs.; starch, ¼ lb.; sodium sulphide, 2 lbs.; oil citronella, ¼ lb.; water, 3 pints. The sodium sulphide is mixed with the soap, and acts as the removing agent; the starch is added for a "binding agent," and the glycerin as an emollient.—Pharm. Era, 1895, 363.

Marble-dust soap composed of common washing soap with three times

its volume of sifted marble-dust added and with four per cent. of lysol. It is intended, like the pumice and such like soaps, to obviate the necessity for using a hand-brush, which latter is generally full of bacilli.—Therap. Monatsheft, Amer. Drug. and Pharm. Rec., 1894.

Wood Pulp and Splint-Making Material.—E. A. Tracy (Med. News, March 17, 1894) says that the basis of the material is wood pulp, made preferably from the crushed fiber of the poplar tree and rolled in such fashion that the broken fibers intertwine in every direction and loosely, so that an increase of plasticity is given the product. These sheets are further strengthened by having a fabric introduced between the layers of the pulp or by interweaving with the short, crushed wood-fiber a long jute or other tough fiber. The sheets are rolled of different thicknesses and are numbered one, two and three, according to their thicknesses in millimeters. The chief characteristics of this material are stiffness or rigidity when dry and plasticity when moist. Its rigidity can be increased *ad libitum* by the use of a silicate solution as a moistener. Its plasticity has a limit, but this is rarely reached except when molding the material over certain complex curved surfaces. Besides the foregoing characteristics, the material possesses that desideratum of a splint material—extreme lightness. Its cheapness also deserves a passing mention.

Water or a stiffening solution can be used to moisten the material. If water is used the splint must be protected from the perspiration, lest it should soften, by a covering of oiled silk or paper, or best by shellac. A stiffening solution with several qualities to recommend it is silicate of potassium; silicate of sodium is almost as serviceable. Any desired degree of rigidity can be imparted to a splint by using this solution, the amount of rigidity depending upon the strength of the solution. Dextrine in the proportion of eight ounces to a pint of water added some tenacity besides stiffness. A splint made with its aid can be moistened with water and remoulded—quite an advantage in many cases.—Pharm. Era, 1894.

Odontol Toothache Drops.—The Nat. Drug., 1894, 176, says: The most powerful and perfect odontalgic that we have ever tried, is made by rubbing together $\frac{1}{30}$ gr. of atropine, 3 grains cocaine and 100 drops camphophenique. It stops an aching tooth with lightning-like rapidity, providing the nerve can be reached. A single droplet placed on the hollow with a hypodermic syringe, or introduced on a pledget of cotton, acts instantaneously, and the relief is frequently permanent. Sometimes a drop of a 5 per cent. solution of aconitine or of atropine does the same thing, but neither is so certain and swift as the mixiure indicated. It seems scarcely necessary to warn against too frequent repetitions of any of the preparations, and especially against swallowing any of them.

Toothache Drops.—The Jour. des Practiciens; Amer. Drug. and Pharm. Rec., 1895, 141, gives the following:

Crystallized carbolic acid	1 part.
Cocaine hydrochlorate	1 part.
Menthol	1 part.
Glycerin	20 parts.

Remove, if possible, any foreign matter that may be in the cavity, and syringe the latter out with a little warm carbolized water (2 per cent.), then saturate a little pledget of cotton with the above solution and place i, in the cavity. If necessary, drop on it a little tincture of benzoint sandarac or collodion, to keep it in place.

Examination of Sputum.—F. F. Metzger employs an instrument that employs the centrifugal force and is a modification of the hæmatokrite of Blitz-Kedin, the calibre of the glass tube in which the precipitation is to take place being two and a half Mm. in diameter, and in length about fifty Mm. The sputum is prepared by placing a small quantity in a porcelain dish and actively stirring it for a few minutes with a glass rod. Under this treatment the sputum soon becomes, without the addition of any diluting fluid, a thin liquid, free from lumps and apparently of homogeneous character. The precipitating tubes are then filled, the sputum being drawn into them by mean sof rubber tubing, having attached to one end a small rubber bulb to produce the necessary suction. The tubes are now placed in the centrifuge and rapidly revolved for at least two minutes. With a speed of 10,000 revolutions per minute, this is ample time to produce complete precipitation of the more solid portions of the sputum. The sputum will then be found to have separated into two layers—that at the distal or peripheral end of the tube being yellowish or greenish in color, and that at the proximal or central extremity appearing as a slightly turbid, almost transparent, watery fluid, which by the microscope is found to contain no cellular elements whatsoever. In the peripheral end of the tube the microscope reveals, closely packed together but their integrity not in the least impaired, the various forms of epithelial and pus cells contained in the sputum, and with these, if present, elastic fibres and tubercle bacilli, which, concentrated in the above manner, are detected with far greater certainty than by the unsatisfactory methods usually employed.—Amer. Drug. and Pharm. Rec., 1895, 6.

Sterilization of Alimentary Liquids.—E. W. Kuhn's apparatus for the sterilization of beer, milk, wine, etc., consists of a cylinder six times the length of its diameter. It is built on the tubular boiler principle, with an outside jacket. Water is injected from below, filling the jacket, and hot water at 75° C. flows through the tubes. In about 10 minutes the temperature of the beer or milk inside the apparatus is raised to 65° C., which has been found to be the best temperature for sterilizing these liquids under pressure. The pressure within the apparatus is about six atmospheres, and the liquid is left for 15 minutes at this temperature and

pressure, the apparatus being slowly oscillated first to the right and then to the left. The hot water is then removed and cold introduced, which in the case of lager beer has ice added to it. Within 10 minutes the temperature is reduced to normal. The apparatus only requires cleaning twice a year, and is never opened except for that purpose. In the case of potable water, it has been found that no lower temperature than 120° C. is sufficient, but there is no necessity for silver-plated sterilizers, and the author uses steel ones.—Brit. and Col. Drug., 1894, 583.

Physiological Action of Tellurium, Tungsten, Cerium, and Thorium.—K. Bokorny gives an account of his experiments on the physiological action of the above substances. Free telluric acid and the alkaline tellurates may be considered as harmless for the lower plants and animals. The tungstates if poisonous are so in a very slight degree only. This is the more important, as uranium, the metal standing next in the series, is decidedly a poison; 0.5 to 2 Mgm. of uranium-sodium tartrate per kilo. of the weight of the body kill animals, with paralytic symptoms. Cerium is slightly poisonous, but less so than lead. Thorium is not poisonous.—Chem. News, 1894, 272.

Mineral Water Salts.—In Dieterich's 6th Ed. of the Pharmaceutical Manual, and Pharm. Drug. and Pharm. Rec., 1895, 95, are contained the following:

Gms, Kesselbrunnen.—For 10 liters.

Sodium chloride	8 Gms.
Sodium bicarbonate	25 "
Potassium sulphate	0.5 "
Calcium sulphate, recently precipitated	3 "
Magnesium sulphate, dry	2.1 "

Gms, Krähnchen.—For 10 liters.

Sodium chloride	9 Gms.
Sodium bicarbonate	22 "
Potassium sulphate	0.4 "
Calcium sulphate, recently precipitated	2.8 "
Magnesium sulphate, dry	2.1 "

Carbonated Chromium Water.—(According to Guntz.)

Potassium bichromate	0.02 Gms.
Potassium nitrate	0.06 "
Sodium citrate	0.06 "
Sodium chloride	2.12 "

Mix, and put the mixture in a glass bottle, cork and label "Salt for ½ liter carbonated chromium water."

The half of this quantity may be poured into a half-pint glass, the glass filled half full of water, stirred with a silver spoon until solution is effected,

and the glass then filled with carbonated water. Drink the water so prepared in the course of ten minutes, with frequent intermissions.

Pyrophosphate of Iron Water.—For 10 liters.

Sodio ferric pyrophosphate	45 Gms.
Sodium pyrophosphate, dried	5 "
Sodium chloride	5 "

Triturate well together and put into a glass container and stopper well, and label "Salt for 10 liters of pyrophosphate of iron water."

Moor Bathing Salt.—

Ferrous sulphate	950 Gms.
Calcium sulphate, precipitated	20 "
Magnesium sulphate	20 "
Sodium sulphate	40 "
Ammonium sulphate	20 "

Bathing Sea Salt.—

Sodium chloride	800 Gms.
Magnesium chloride	110 "
Calcium chloride	20 "
Potassium bromide	3 "
Potassium iodide	2 "
Magnesium sulphate	65 "

Serum Powder, Serum Paste, and Peptone Paste are three wound-protectives introduced by C. L. Schleich (Pharm. Ztg., 1894, 806). *Serum Powder* is obtained by drying, powdering, and sterilizing blood-serum from cattle. To maintain asepsis, camphor and boric acid, or zinc oxide or lysol, are added. For use on wounds, the serum powder may be combined with various medicaments, particularly iodoform and nuclein, the latter of which is credited with the remarkable property of removing necrotic tissue from wound-surfaces. Besides in powder form, the author applies blood-serum in paste form, prepared with the aid of zinc oxide and a little wax. This "Pasta serosa" is of the consistence of honey, and insoluble in water; when spread over a wound, it soon dries up to a thin, elastic film. It may be combined not only with the ordinary antiseptics and cicatrizants, but also with metallic mercury, it is stated, and in almost every proportion. The mercurial serum-paste thus obtained may be applied with a brush if it be previously diluted with aqueous solution of ammonium chloride. Five to ten Gm. of this paint are spread in a thin layer on the wound-surface, and stroked with the brush until dry. It is stated that the black mercurial film left adheres firmly, remains dry, and does not stain or soil the linen; also, that the mercury is readily absorbed, especially if the skin has previously been well rubbed with a brush. The dried mercurial paste can easily be washed off again with plain water. *Peptone Paste* consists of Adamkiewicz's peptone, "wax-paste," acacia, zinc oxide, and starch: it is soluble in water and dilute solutions of the alkalies, and serves

for fixing dressings. For this purpose it is spread in a circle outside the margins of the wound; the wound itself is suitably dressed, and, finally, a piece of gauze is pressed upon the ring of paste. The latter is said to dry in about fifteen minutes to the hardness of a stone, and to constitute a firm protecting wall from which, in changing the dressing, the gauze is cut out, and replaced, after the wound has been redressed, by a fresh piece attached to the old ring. When the wound has healed, the paste ring is removed by a bath.

Powdered Galls in the Treatment of Burns.—Grose finds the application of an ointment composed of 1 part of powdered galls with 8 parts of boric acid ointment, an excellent means of diminishing the discharge and disinfecting the wound, so as to promote rapid cicatrization.—Rev. de Therap., 1895; Pharm. Jour. Trans., 1895, 1115.

Cold "Burns."—In the accidents which have attended the manipulation of liquid air and other substances in his laboratory, Raoul Pictet has distinguished two degrees of burns from the intense cold. In the first the skin is reddened, turning blue the next day. The spot doubles in area on the following days; there is intense itching, and five or six weeks are usually required for healing. In the more severe burns, those of the second degree, the skin is rapidly detached. A long and stubborn suppuration sets in, and healing is very slow, and altogether different from that of burns from fire. On one occasion, Pictet, while suffering from a burn due to a drop of liquid air, seriously scorched the same hand. The scorched portion was healed in ten or twelve days, whereas the cold burn was still open six months afterwards.—Brit. and Col. Drug., 1894, 371.

Treatment of Burns.—A writer in the Eclectic Medical Journal recommends washing the parts with a solution of carbolic or salicylic acid, then clip the blister, let out the fluid, and cover the burned surface with subnitrate of bismuth, then with antiseptic cotton. The latter is removed and changed from time to time, the burned surface being dusted with the bismuth. The pain ceases in a very few minutes, and the healing process proceeds rapidly.—West. Drug., 1895, 104.

Dressing for Temporary Treatment of Severe Wounds.—Branere recommends as a dressing for embalming crushed limbs or other severe wounds, so that surgical intervention may be safely postponed, an antiseptic gauze compress saturated with the following unctious dressing:

Salol, Resorcin, Antipyrine	of each 12 parts.
Boric acid	20 parts.
Iodoform	1 part.
Vaselin	160 parts.

—Revue de Therapeut. Jan. 1, 1895; Pharm. Jour. Trans., 1895, 959.

Dressing for Wounds.—Van Arsdale recommends the following:

℞ Bals. Peru ..... ℥ xxx.
Ol. Ricini ..... ℨ i.

on absorbent gauze (sterilization not necessary), as it prevents the union of the edges of the skin, and allows the gauze, like a moist sponge, to absorb the discharge as fast as formed from the wound.

Directions for Use.—Take cheese-cloth or absorbent gauze, fold it about 16 to 32 thicknesses, large enough to a little more than cover the wound, pour on sufficient balsam oil to soak three or four layers of gauze, and apply the oily side directly to the wound. Next cover the gauze with gutta percha or rubber tissue—oil muslin or oil silk will do as well—then bind the whole on with a triangular or roller bandage.

Uses.—The above dressing is applicable to all cases where the skin has been in any way injured, such as bruises, cuts, burns, scalds, acids, punctured wounds, bites of snakes or animals, insect stings, frost bites, crushed fingers or toes, etc. Leave the dressing on for three days, if surgical advice cannot be secured. This places the wound under the most favorable conditions for rapid healing. For first aid purposes, one ounce balsam oil, one yard absorbent gauze and nine square inches rubber tissue will be q. s. for the majority of wounds. Large quantities must be supplied in cases of extensive destruction of skin, as in burns or scalds.

Urine and Urinary Analysis.

Salicylates as a Source of Error in Urine Analysis.—F. W. Haussman (Merck's Market Report, 1895, 106) has employed the following modification of Bruecker's process:

About 15 C.c. of the salicylic urine is completely precipitated by the official solution of lead subacetate. This removes the chlorides, sulphates, and phosphates present, almost all the salicylic acid, the coloring matter, and the glycuronic acid. The lead precipitate, in the presence of the latter, is apt to darken rapidly. The excess of lead remaining in the filtrate is removed by hydrogen sulphide; but to the pharmacist this is sometimes objectionable, owing to the odor of the sulphuretted hydrogen, as well as to the time required. In such cases the excess of lead may be precipitated by means of diluted sulphuric acid, the excess of acid being carefully neutralized with potassa.

The urine will then contain only the glucose, if any is present, and may be examined with Fehling's solution or other suitable reagents in the usual manner.

Preserving Organized Urinary Sediments.—Bohland recommends the following process: Collect the sediments by draining off the urine as much as possible; wash with physiological salt solution (4 sodium chloride, 3 sodium carbonate, 1,000 water), immerse in Muller's liquid (20 potassium

dichromate, 10 sodium sulphate, 1000 water). Renew this three to four times during a fortnight. After the Muller's liquid has been removed carefully, harden with alcohol. The alcohol is removed until it remains quite colorless. The organized parts of the urinary sediment remain unchanged, except that they appear somewhat shrunk.—Pharm. Centralh., 1895, 260. (See, also, Centralh. f. innere Med., May, 19, 1894.)

The Micro-Chemic Reactions of Urinary Sediments.—While the diagnostic significance of the staining reactions of various organic substances has received recognition in both biologic and histologic research, the application of this method of differentiation is capable of extension and elaboration. The schizomycetes, for instance, present such a close resemblance one to another, that it is often impossible to recognize a given variety from its morphologic appearance. Some can be discriminated by their behavior when exposed to certain stains and decolorizing reagents, while the identity of others is only to be established by their appearance in cultures. Histologically we know that a body and the nucleus of a cell each reacts differently to stains; as do also healthy and diseased structures. Extending the application of the principle, we find that tube-casts in the urine when stained behave diversely in accordance with their chemic constitution, amyloid casts for instance, assuming a mahogany tint when treated with iodine, and a deep blue when treated with gentian-violet. An interesting contribution to the subject of the color-reactions of urinary sediments has recently been made by Grosz (Internat. klin. Runds., 1894, 1465), who has studied the formed elements contained in the urine stained with alizarin. To a drop of urine placed on a slide he adds a drop of a 1 per cent. solution of sodium alarzin-sulphonate, and then covers, the examination being made after the lapse of about a minute. The sediment present is stained differently according to the reaction of its constituent elements. Thus, those of acid reaction appear yellow, those of alkaline reaction violet, and those of neutral or feebly acid reaction red. In the urine from cases of acute gonorrhœa were found cylindroidal bodies of mucin, staining red, and resembling tube-casts, the likeness being increased by the presence of leucocytes and epithelial cells. Further investigation rendered it probable that these bodies (which are not visible in unstained preparations) are derived from the glandular apparatus of the urethra, and more particularly from the glands of Littre. Other long, convoluted, and hyaline cylindrical bodies, upon which are seated isolated leucocytes and epithelial cells and which appear in unstained preparations as structures of faint contour, are derived from the prostate gland, of disease of which their presence is suggestive. They were also found in the urine passed after coitus. In contradistinction to these urethral and prostatic structures, renal tube-casts stain intensely yellow. The presence of casts is also associated with the absence of a mucoid ground substance that stains red, and accompanies the other two. In some cases of disease of

the posterior portion of the urethra, leucocytes stained violet were observed, but the number of cases was not sufficiently large to establish the diagnostic significance of the observation. The opinion is expressed that the reaction of the epithelial cells progresses from acid to alkaline, from the surface to the deeper layers; so that the reaction of the sediment in the urine will indicate the nature and seat of the morbid process in the genito-urinary tract.—Med. News, Jan. 5, 1895; Pacific Druggist, 1894.

The Preservation of Organized Urinary Sediments for Subsequent Examination.—Crystalline urinary sediments are so easily obtained that there is no advantage in attempting their preparation, which is always difficult. Organized sediments, on the other hand, may be preserved tolerably well unaltered in several fluids. One of the simplest and best of these is a mixture of glycerin and distilled water in such proportions as to secure the average specific gravity of urine, about 1.020, to which is added carbolic acid in the proportion of one part to 100. A weak solution of salicylic acid is also efficient, and W. W. Keen recommends a solution of chloral, ten grains to the ounce. Beal's naphtha and creosote solution is official, but much more troublesome to prepare.

E. S. Wood recommends very highly a filtered solution of acetate of potassium, specific gravity between 1050 and 1060, to which carbolic acid has been added in the proportion of 4 to 5 C.c. of the deliquesced crystals to one liter of the acetate solution. Instead of carbolic acid, salicylic acid may be added to saturation. When urine is to be transported in hot weather, or kept several days for any reason, a pinch of salicylic acid added to a four-ounce vial is generally sufficient to prevent decomposition, and in no way impairs the reaction or alters the sediments.

To use any of these fluids, allow the sediments to subside in a conical glass, decant the supernatant fluid, replace the latter with the preservative, stir up the sediment, allow again to subside, decant again, and replace with a fresh portion of the preservative. Repeat this until the urine is thoroughly replaced by the preservative. Then place the sediment and preservative in a well-stoppered ordinary vial, in which they may be kept for years without marked change; or the sediment thus permeated by the preservative may be mounted in shallow cells, over which a thin cover-glass is cemented.—Tyson, Practical Examination of Urine. (Pacific Drug. and Phys., 1895, 86.)

The Staining and Mounting of Tube Casts and Other Organic Urinary Deposits.—Bramwell (Brit. Med. Journal, No. 1,749, p. 9) makes the fol lowing suggestions for the study of urinary sediments: An ordinary conical urine glass is filled with equal parts of urine and an aqueous solution of boric acid, and set aside until the deposit settles. This is then removed by a pipette and transferred to an ordinary test-tube containing about a half drachm of a solution of picrocarmin, and the two are thor-

oughly mixed and set aside for twenty four hours. Some of the sediment is then removed by means of a fine-mouthed pipette, and mounted. If there is reason to suspect the existence of amyloid disease of the kidneys, a solution of methyl-violet may be used instead of that of picrocarmin. In order to bring out the fine details of the tube-casts stained in manner described, and in order to preserve them as permanent preparations, they may be mounted in Tarrant's solution, consisting of gum Arabic and distilled water, each four parts, and glycerin two parts, with a little camphor. A small test-tube is filled three-quarters with this solution, and in it is placed, by means of a fine-mouthed pipette, the stained deposit from the test-tube containing the mixture of urine and picrocarmin. The smaller tube is securely corked, inverted two or three times in order to facilitate thorough mixture, and put aside until the sediment has time to settle. In the course of three or four days a minute drop of the deposit is removed from the bottom of the tube by means of a fine-mouthed pipette and placed upon a slide and covered. The preparation may, in the course of a few days, be sealed in the ordinary manner. If the preparation, thus mounted, be overstained with the solution of picrocarmin, the deposit should be transferred to fresh Tarrant's solution. Any organic urinary deposits may, of course, be stained, mounted and preserved in the same manner.—Ibid.

Acidity of Urine.—V. Lieblein gives a long and critical account of the various methods, chemical and colorimetric, by means of which the acidity of urine, and the various factors of which it is made up, can be determined. The following general conclusion is drawn, that by the estimation of phosphoric acid in the form of diphosphate alone, can a trustworthy measure of the acidity of urine be obtained.—Zeit. f. physiol. Chem., 1894, 52.

Acetone in Urine.—E. Salkowski.—In estimating acetone in urine by conversion into iodoform, the possibility that acetone might in part originate from carbohydrates in the urine during distillation was suggested. On putting this to the test of experiment, it was found that sugar in urine does not give rise to a substance which gives many of the reactions of acetone, but which is an aldehyde, probably acetaldehyde.—Pflüger's Archiv., 1894, 339; Jour. Chem. Soc., 1894, 370.

Spiegler's Albumen Reagent.—The author of this reagent* calls attention

* Spiegler's albumen reagent.

Hydrargyrum bichloratum	2.0
Acidum tartaricum	1.0
Aqua destillata	50.0
Glycerinum	5.0

The reagent is placed in a test tube, and by means of a pipette, a sample of the urine is caused to flow over and form a distinct layer above the reagent. No white cloud or ring should form at the line of contact.

to the fact that in applying this test for albumen in samples of urine of a very low gravity, its delicacy is considerably improved. This may, however, be overcome by the addition of a small amount of a saturated solution of sodium chloride to the urine. This does not exert any solvent action upon the mercury albuminate. The delicacy of the reaction (1 to 350,000) may be increased to 1 : 1,000,000 through concentration of the urine by evaporation.—Alumni Jour., 1894, 201.

Approximate Determination of Albumen in Urine.—In cases where it is not essential that the determination of albumen in urine should be very exact, Rössler recommends a volumetric method which can be carried out very readily, and give results that are comparable. Into a test tube containing a mixture of 5 C.c. of acetic acid and two or three drops of potassium ferrocyanide solution (1 to 10), the urine to be tested is poured through a funnel, so as to form a layer on the surface. When albumen is present a white zone is formed, which is proportionate in thickness to the amount of albumen, and the indication thus afforded in from ten to thirty minutes may be taken as a measure of the relative proportion of albumen in the urine.—Apoth. Zeit., 1894, 563.

Two Delicate Tests for Albumen.—Fouchlos claims that the following two tests are of extreme delicacy and without any possible fallacy :

1. Add to the urine a few drops of a one per cent. solution of corrosive sublimate ; in case of turbidity add some few drops of acetic acid. If turbidity persists, it is due to the presence of albumen.

2. Take 100 C.c. of a ten per cent. solution of sulphocyanate of potassium and add 20 C.c. of acetic acid. Add a few drops of this mixture to the urine. There will be an immediate turbidity if albumen in small amount be present, and a heavy white precipitate if a large amount of albumen be present.—Progres Medical., 1894.

Estimation of Albumen by Méhn's Process.—L. Ringaud.—Méhn recommends coagulating the albumen with phenol and washing the precipitate with a boiling saturated solution of the same. The author, having tried the method finds that a very appreciable amount of albumen is dissolved by the washings, but that no appreciable loss is incurred by washing with cold water containing 3–4 per cent. of phenol.—Jour. Pharm. Chim., 1894, 364.

Millard's and Tanret's Tests for Albumen.—In a paper upon "Albuminuria in Nervous Diseases" (Am. Jour. Med. Sci., Oct., 1894), prepared by L. C. Gray and A. Zimmerman, we find the following useful summary of chemical methods employed in urinalysis :

Tanret's.

Potassium iodide	3.32	Gm.
Mercury bichloride	1.35	Gm.
Acetic acid	20	C c.
Distilled water, q. s.	100	C.c.

Millard's.

Carbolic acid	f℥ij.
Glac. acetic acid	℥vij.
Solut. potassa	℥xxij.

Albumin.—(Serum albumen, serum or paraglobulin, nucleo-albumen from bile, mucin from bile, mucin from mucous membrane.)

Clarifying.—To about one ounce of the urine add about 60 grains of powdered French chalk, shake together, pour upon a four-ply wetted paper filter; throw away the first portion of the filtrate; return the following portions until the urine passes perfectly clear. When the specimen is in an advanced state of mucous fermentation, in which the mucous is so minutely subdivided by the increased number of bacteria that it cannot be clarified by the above method, then the addition of caustic potassa or soda to strong alkaline reaction without heat, followed by filtration through a wetted double paper filter, will clarify it. It will be necessary to return the filtrate several times before it passes perfectly clear.

The filtered specimen is divided into three-quarter-inch test tubes, filling them about one-third full. To the first add 15 drops of Tanret's test; to the second 15 drops of Millard's test; and to the third 15 drops of acetic acid. The reaction should be acid in all the tubes. Heat the three tubes to the boiling point, and while the contents are hot hold them up to a good light, with a strip of black paper or card-board a short distance back of them, about half the way up to the level of the fluids, and note the results. Set aside for thirty minutes, and again heat to the boiling point and note the results a second time. It is important that this length of time elapse before noting the last result, as minute quantities of albumin require this length of time for complete precipitation. The results should be noted directly after heating to the boiling-point, as one of the reagents precipitates all the alkaloids, peptones, and ptomaines, the other only a few of them, the precipitates of these bodies being retained in solution while hot; consequently they do not interfere with the albumin reaction.

The tube in which the acetic acid has been added is best held between the tubes containing the other reagents, any change in reaction being more easily perceptible. The acetic acid is used in addition to the reagents to detect soluble and dissolved mucin, combined acids of oleoresins, combined fatty acids, and other bodies yielding precipitates in acid media. The albumen reagents all being used in acid media, form precipitates when such substances are present; thus the acetic acid prevents any errors which may otherwise arise.

If albumin be present there will be an increased cloudiness or precipitate in the tubes to which the Millard's and Tanret's tests have been added. When very faint traces are present the opalescence produced, being distributed throughout the liquid, is more easily perceptible than the results

obtained by applying the zone or contact test; the reagents being free from color, and the urine also deprived of considerable coloring matter by filtration through the French chalk, gives greater delicacy to the reaction.

When the specimen is acid and the reaction by Millard's test is more decided than that by Tanret's and acetic acid, being least by Tanret's, it shows the presence of mucin from bile and the nucleo-albumen from bile. This mucin appears to be the only soluble form of mucin found in acid urine, and with it is always to be found the nucleo-albumen, the mucin from the mucous membrane being soluble only in alkaline urine. The reason that Millard's test gives this increased reaction is that it is a more delicate reagent for mucin than either acetic acid or Tanret's test.

When the reaction is more decided in the tube containing the acetic acid than it is in the tubes to which the Tanret's and Millard's tests have been added, and no foreign bodies are precipitable by acetic acid, it shows the presence of serum or para-globulin.

When serum albumen alone is present, the reaction is indicated in the tubes containing the Millard's and Tanret's tests, acetic acid giving no reaction unless mucin be present, as in alkaline urine or in specimens which have been treated with alkali for clarification, when the source is the mucous membrane, or in acid specimens when it is derived from the bile. When mucin is present in solution from either source, the Millard's test always gives more increased reaction than the Tanret's test for acetic acid, being much more decided in the tubes containing the acetic acid and the Millard's test.

When any of the other forms of albumen are present with the serum albumen, the specimen is best treated with one-fourth its volume of glacial acetic acid, heated to boiling, set aside for one hour, then filtered through French chalk as above directed. This separates mucin from bile and mucous membrane, serum-globulin, and foreign substances, there being retained in solution serum-albumen and the nucleo-albumen from bile, and these may readily be differentiated by adding ferrocyanide of potassium to the acetic acid solution, without applying heat; the ferrocyanide, being a more delicate reagent for the nucleo-albumen than either Tanret's or Millard's tests, yields a heavier reaction.

Test for Bile Pigment in the Urine.—Henry Roc proposes the following: A portion of the urine is poured into the test-tube, which is held inclined. Two to three C.c. of a solution consisting of ten parts of official tincture of iodine mixed with 90 parts of alcohol are then poured in with great care, so that the iodine mixture overlies the urine, but does not mix with it. Almost instantly a grass-green ring will be seen to be developed at the point of contact of the two fluids. If no bile pigment is present, the ring will be either colorless or of a light yellow color. This is said to be the most delicate and reliable test for bile pigment which has yet been proposed.—Am. Med. Jour., 1894.

Electrolysis of Urinary Calculi.—Yvon (Rép. de Pharm., 1894, 299) has found that when a current of electricity is passed into a solution of sodium sulphate by means of two electrodes of platinum, the solution is decomposed, sulphuric acid and oxygen being set free at the positive pole and sodium at the negative pole; the sodium by a secondary reaction being converted into caustic soda. If a urinary calculus is placed between the points of the electrodes, the whole plunged into a solution of sodium sulphate, and the electric current turned on, the calculus will dissolve or melt away at points of contact. In his experiments the dissolution of calculi composed of triple phosphates and earthy carbonates took place at the positive electrode; uric acid calculi were acted upon by the negative electrode.

He believes that his experiments prove that the dissolution of urinary calculi by electrolysis can be accomplished, and suggests a method of operating within the bladder walls. The bladder is emptied of urine, filled with a saturated solution of sodium sulphate, and two electrodes of platinum, insulated and in shape resembling a lithotrite, are introduced. One of the electrodes is made slightly concave at the point where the calculus is seized, while the other terminates in a blunt point. The two exposed points are completely separated from each other, while communication with the battery is maintained. The calculus will undergo perfect dissolution at the point of contact, and the time taken for the operation may vary one or two hours.

Carbohydrates of Normal Urine.—K. Baisch.—The two carbohydrates in normal urine, identified by a very complete examination of their reactions and properties, are glucose and a dextrin-like substance (animal gum). The quantity of glucose averages 0.005 per cent., and of total carbohydrate reckoned as glucose about twice that amount. There appears also to be a small quantity of a third reducing carbohydrate, which was not, however, satisfactorily identified.—Zeit. f. Physiol. Chem., 1894, 339.

Estimation of Chlorine in Urine.—E. Bödtker.—Mohr's method gives too high results, as the urine contains substances which hinder the end reaction, probably by dissolving silver chromate. To incinerate the urine first is a tedious process, and results as good are obtained by the following method, the principle of which is to perform the reverse of what is usually done, namely, to estimate silver by means of sodium chloride. The urine is first made strongly acid with nitric acid, and excess of silver solution added; in the presence of nitric acid, and absence of bromides, iodides, and thiocyanates, silver chloride is alone precipitated. By careful neutralization of the filtrate with a feeble alkali, such as magnesia, a liquid is obtained in which the excess of silver can be estimated by titration with sodium chloride.—Zeit. f. Physiol. Chem., 1894, 193.

Hæmatoporphyrin in Normal Urine.—A. E. Gerrod.—Renewed research

confirms the author's previous conclusion that hæmatoporphyrin is a scanty but normal constituent of urine. 20 C.c. of a 10 per cent. solution of sodium hydroxide are added to every 100 C.c. of urine; the precipitated phosphates are collected and washed with water. The precipitate is dissolved in rectified spirit and acidified with hydrochloric acid; the solution shows the bands of acid hæmatoporphyrin. Ammonia is then added to precipitate the phosphates, and acetic acid to redissolve them; chloroform then extracts hæmatoporphyrin completely, and shows the bands of the alkaline pigments.—Jour. f. Physiol., 1894, 349.

Ethereal Hydrogen Sulphate in Urine.—J. Eiger.—The ethereal hydrogen sulphates in the urine are increased in most diseases of the liver. The liver, under normal circumstances, probably oxidizes aromatic substances. In intestinal catarrh and in kidney diseases these constituents of the urine are also increased. By disinfection of the alimentary canal and rapid removal of its contents, the ethereal hydrogen sulphates are diminished. α- and β-naphthol, hydrochloric acid, hydrogen phosphate, and sulphuric acid cause an increase; quinine nitrate and lactic acid, a decrease in these sulphates. Calomel produces the latter result when it causes purgation also. Potassium iodide, arsenic, ipecacuanha, digitalis, convallaria, adonis vernalis, opium, morphine, codeine, and bismuth salicylate, have no effect.—Chim. Centr., 1894, 873; Pharm. Zeit. f. Russland, 23, 149.

Detection of Iodine in Urine.—A. Jolles compares the sensitiveness of his method, which consists in mixing 10 C.c. of the urine with an equal volume of concentrated hydrochloric acid and running 2–3 drops of a weak solution of bleaching powder down the side of the test-tube, and then adding starch solution with that of Sandlund, and finds that, although the latter is the more sensitive in aqueous solutions, this is not the case in urine. The lower limit is for Sandlund's test 0.003825 Gm., and for his own 0.00153 Gm. of iodine in 100 C.c. After taking copaiba balsam, compounds occur in the urine which absorb iodine and impair the sensitiveness of the test. In this case, 10 C.c. of the urine is to be shaken with 5 C.c. of chloroform and filtered before testing. For quantitative estimation, the author's method, as well as either of Sandlund's, give satisfactory results.—Zeit. f. anal. Chim., 1895, 543.

Leucomaine Obtained from the Urine of a Patient Suffering from Angina Pectoris.—A. B. Griffith and C. Massay.—This base is white and crystalline, soluble in water; reaction slightly alkaline. It forms a crystalline hydrochlorate, chloroplatinate, and chloraurate. It gives a yellowish precipitate with phospho-tungstic acid, a yellow with phospho-molybdic acid, a red with tannic acid, and a greenish with silver nitrate. With mercuric chloride it gives a green precipitate, and with Nessler's reagent a brown precipitate. Its composition agrees with the formula $C_{16}H_9NO_4$. It is very poisonous, producing fever and death in two hours. It is not present in normal urine.—Compt. rend., 1895, No. 20; Chem. News, 1895, 282.

Determination of the Total Nitrogen in Urine by Henninger's Method.—H. P. Bayrac.—A dispute concerning a modification of the Kjeldahl method, which in reality was introduced in 1884 by Henninger, and not, as Moreigne supposed, by Petit and Monfet.—Bull. Soc. Chim., Vols. xi. xii., No. 23.

Estimation of Total Nitrogen in Urine by the Schneider-Seegen Method.—F. Voit.—The Kjeldahl method of estimating nitrogen has the disadvantage of taking a long time to perform. This is not the case with the older method of Schneider Seegen. The latter, however, has lately fallen into discredit, and the object of the present paper is to show that it is quite as accurate as Kjeldahl's process. The method is a modification of that of Will and Varrentrapp, adapted for the examination of urine, and briefly consists of heating the urine with soda lime, and thus obtaining all the nitrogen in the form of ammonia.—Zeit. Biol., 1894, 168; Jour. Chem. Soc., 1894, 476.

Peptone in Urine.—E. Salkowski.—Addition of commercial peptone to the extent of more than 0.1 per cent. to urine can be detected as follows: 50 C.c. of urine is acidified with 5 C.c. of hydrochloric acid, and precipitated with phosphotungstic acid and warmed. The precipitate, which aggregates on standing, is collected in a filter, washed twice with water, and then mixed with 8 C.c. of water and 0.5 C.c. of sodium hydroxide solution, by which means a deep blue coloration is developed. By warming in a test-tube this becomes a dirty gray yellow, and then, on the addition of a few drops of a 1 per cent. solution of copper sulphate, gives the usual biuret reaction. Urine rich in mucin or albumin, must be freed from these in the usual way before applying the test.—Chem. Centr., 1894, 658.

Peptone in Urine.—W. Robitschek.—Peptonuria is found in many diseases, especially during suppuration, and also in phosphorus poisoning. Devoto's method is recommended for its detection.—Chem. Centr., 1894, 780; from Zeit. Klin. Med., 24, 542.

Rhubarb in Urine.—E. Proksch recommends the following new tests for determining rhubarb in the urine:

(1) Treat the urine with HCl, then shake out with xylol, and then add to the latter a solution of KOH; in about five to ten minutes, at the line of contact of the two solutions there will be a rose-colored ring.

(2) Treat the urine with HCl, shake out with $CHCl_3$; then treat with KOH, and if rhubarb is present there will be a violet ring at the point of contact of the two solutions.

(3) Using H_2SO_4 instead of HCl, with the chloroform solution, a rose-colored ring is obtained.

(4) On treatment of the urine with sulfanilic acid and then shaking out with xylol, the heavier solution will take a wine-red color and the xylol solution a faint rose-color.—Zeitsch. Œst. Apoth. Ver., 1895, 337.

Sarcolactic Acid in Pathological Urines.—E. Schütz.—The detection of small quantities of sarcolactic acid added to the urine is quite feasible. The method employed is described. Morbid urines from thirty patients suffering from a variety of diseases, some of which previous observers have stated lead to the excretion of sarcolactic acid, were examined, always with negative results. A crystalline compound of zinc was, however, obtained, which might be mistaken for zinc sarcolactate; but analysis showed it could not be such, moreover it contained nitrogen. The chief substance present in the crystals is considered to be zinc hydroxyphenylacetate, or a mixture of this with zinc hydroxyphenyltropionate; perhaps hippuric acid is present also.—Zeit. f. Physiol. Chem., 1894, 482.

Estimation of Sugar by Fehling's Solution.—E. Nihoul's process has been criticised by Grünhut, who states that neither simple roasting nor treatment with nitric acid and subsequent ignition is capable of fully converting cuprous oxide into the cupric compound. The author has made a series of experiments, which show the incorrectness of Grünhut's statement.—Chem. Zeit., 1894, 881.

Determination of Sugar by Ammonio-Cupric Solution.—J. Peska proceeds as follows: Measure into a dry beaker 50 C.c. of the ammnio-cupric solution from a burette, to which add from a pipette 50 C.c. of the alkaline seignette solution, so that all the copper is washed off the sides of the glass, and immediately cover the liquid with a layer of pure paraffin oil about 0.5 C.m. deep. Heat the liquid carefully over wire gauze up to 80°, measured by the thermometer serving as a stirring-rod, and run in down the side of the vessel the sugar solution out of a Geissler burette tapped in front, so that the burette itself may stand on one side and be shielded from the heat of the flame by a sheet of asbestos. The sugar is added by C.c., the mixture being carefully stirred between whiles, and the temperature should be between 80° and 85°. Arrived at the point when the addition of 1 C.c. decolorizes the liquid, the second experiment is proceeded with. This consists in an exact repetition of the first, except that the sugar is run in at once, and that 1 C.c. less of sugar is taken, so that the liquid remains blue. Now push the beaker away from the point of the burette, and wash down the sugar on the side of the glass with 10 drops of water from a pipette. Then bring the temperature up to 85° again in two minutes, and continue adding the sugar by $\frac{1}{10}$ of a C.c. with gentle stirring, until the color disappears. As, notwithstanding the oil layer, the liquid gradually oxidizes, the whole reaction, from the first addition of the sugar until complete decolorization, should be carried out in five minutes. The third test is a check repetition of the second. The author cites typical analyses showing the concordant results obtained by this method.—Chem. News, 1895, 235.

Modification of the Copper Test for Glucose.—Allein and F. Gaud find

that the free potash or soda in Fehling solution causes the decomposition of a part of the glucose to be estimated, and thus causes the low results known to be obtained by that method. The following solution gives results free from this error: 8.7916 Gm. of pure copper are dissolved in 93 Gm. of sulphuric acid. The solution is diluted with its own volume of water, and the whole made up to 1000 C.c. with strong ammonia. A deep blue solution is thus obtained, which is perfectly stable, and of which 10 C.c. corresponds with 0.05 Gm. of glucose. The estimation is conducted in a flask filled with a triple-bored cork to admit the end of the burette containing the glucose solution and tubes for passing a current of hydrogen. 10 C.c. of the ammonio-copper solution and 10 C.c. of ammonia are introduced into the flask on a water-bath, and heated to about 80°, and the liquid containing the glucose is then added, drop by drop, until the solution becomes colorless. If desired, the solution may be reoxidized (by substituting a stream of air for that of hydrogen as long as the produced color deepens), and a second estimation be then performed. The cuprous oxide dissolving in the ammonia to a clear, colorless solution, renders the end of the reaction very sharp and exact.—Jour. Pharm. Chim., 1894, 305.

Estimation of Sugar in Urine.—A. Jolles (Pharm. Runds., 1894, 257) arrives at the following conclusions based on very large experience: Sugar is not a constituent of normal urine, as it is only by operating on a very large quantity of such a urine that traces of sugar can be discovered. It is essential that a specimen taken from the collected urine of the entire 24 hours be used in examining for sugar, as the author cites a case in which at one time of the day the urine of a diabetic patient had a specific gravity of 1.005, and showed only very slight traces of sugar, while that taken the next morning had a specific gravity of 1.029 and contained 1.8 per cent. of sugar. A high specific gravity does not, however, necessarily indicate the presence of sugar, as urine is not infrequently found which is rich in the normal constituents and uric acid, but entirely free from sugar, though the specific gravity goes as high as 1.028 to 1.032. The average specific gravity for normal urine he places between 1.018 and 1.022. Small quantities of sugar do not materially affect the specific gravity.

The Trommer and Worm-Muller tests allow of the recognition of 0.08 per cent. of sugar, but generally the results are so ambiguous that as much as 0.24 per cent. may sometimes be overlooked. Among the reducing substances which obscure the conclusions when looking for sugar, besides uric acid and creatinin, the urinary pigments and the bile pigments occupy an important position. The author has observed the presence of 0.16 per cent. of uric acid, which is sufficient to cause a noticeable reduction. The quantitative examination of urine rich in uric acid but entirely free from dextrose, yielded, with Fehling's solution, results which, calculated as grape sugar, varied from 0.06 to 0.24 per cent.

When it is borne in mind that bilirubin has always a pronounced tendency to take on more oxygen, one molecule being capable of taking up 5 of oxygen in the change to a higher product, it will be seen how important a role it plays in the reduction of Fehling's solution. A similar state of affairs exists in relation to the various urinary pigments which are found particularly in reddish or dark-brown urine, even though they are not bilirubin itself.

The ammonia which would hold the cuprous oxide in solution, thereby obscuring the test, amounts in normal urine to not more than 0.06 to 0.88 Gms. for the 24 hours. Generally, however, decomposition has already set in, in the samples of diabetic urine sent for examination, by reason of having been kept standing too long, and the urea is to a greater or less extent decomposed, so that the ammonia present under some circumstances may exert a decidedly disturbing influence.

The author had observed in some specimens rich in ammonia that no reduction of copper occurred at all in the Trommer test, although, beyond doubt, they contained small quantities of dextrose, in one case as much as 0.3 per cent. The fact that in samples containing very little ammonia (those observed contained 0.008, 0.006, 0.02 and 0.07 per cent.) the precipitation of cuprous oxide is prevented on boiling, leads to the conclusion that there are other constituents beside ammonia which possess this inhibitive property. It should be borne in mind also that certain constituents of urine may be converted into ammonia on boiling the alkaline solution.

On Seegen's and Nylander's Tests.—The author was unable to obtain satisfactory results with Seegen's test. Nylander's test is unreliable in the presence of less than 0.3 per cent. of sugar. Furthermore any albumen present must not be precipitated but must be removed by boiling, as otherwise traces of sugar may be carried down with the precipitate. The presence of blood and of pus also has a disturbing influence, and since these substances cannot be removed without affecting the sugar content, cases not infrequently occur in which Nylander's test indicates a very small quantity of sugar as being present in urine which does not contain any trace of dextrose.

It must be remembered that certain medicines, such as rhubarb, oil of turpentine, large doses of quinine, arsenic, salicylic acid, sulphur, the mercurials and iodides, may exert a disturbing influence.

Other reduction tests, such as the Knapp test, with an alkaline solution of mercuric cyanide, the test with indigo solution, with picric acid, etc., are not conspicuously valuable on account of either their certainty or their sharpness, rather resembling the Nylander test in both respects.

In 200 cases in which Jolles made comparative examinations with the polariscope and with the Fehling-Wendriner test, only 46 cases yielded approximately uniform results; in 86 specimens the difference varied from

0.1 to 0.6 per cent.; in 52 tests the variation ranged from 0.4 to 1 per cent. and in the remainder from 1 to 1.6 per cent. In addition to the optically active normal constituents of urine whose presence vitiates the results of observations made with the polarimeter, the presence of drugs may also have a disturbing influence. A specimen in which glycuronic acid occurred, for instance, possessed a dextro-rotatory power of 0.8, notwithstanding that the total absence of sugar had been completely established. Milk sugar, which is present in the urine of parturient women, is also confusing, as it is dextro-rotatory. Furthermore, the laevo-rotatory beta-oxy-butyric acid which, associated with acetone and acetic acid, is always present in all of the severe forms of diabetes mellitus, may prove a disturbing factor.

Among the other substances which influence the results of polarimetric observations is the lævulose, which appears after the patient has partaken freely of fruit. After the administration of benzosol, Jolles observed the presence of hippuric acid and of guaiacol in the urine, and furthermore the investigations so far carried out indicate that benzosol forms with some product of the organism a substance, a solution of which has a lævo-rotatory action in the polariscope. Preparations of the ericaceæ contain arbutin and quinic acid, which also affect polariscopic observations.

The Fermentation Test.—To properly carry out the fermentation test it is essential to use yeast, which is entirely free from starch; efforts to hasten the process by raising the temperature are not to be commended. This test is not to be relied upon in the presence of less than about 0.1 per cent. of sugar.

To that class of sugar tests which can be resorted to in dubious cases as yielding certain results, the phenylhydrazin test belongs. The statement of Geyer that this gives a crystalline precipitate with the majority of normal urines is incorrect. The crystals of glycuronic acid combination not infrequently appear as indicated above. The duration of the boiling has no influence on the formation of the combinations of glycuronic acid, although Hirschel states the contrary.

The glucose-azone crystals, though similar to those of the glycuronic acid combination, can be definitely distinguished by means of the microscope. The limit of sensitiveness of the phenylhydrazin test for sugar in urine is on an average at about 0.03 per cent. The sensitiveness is less in concentrated urine, rich in urates and albumin.

Jolles recommends that in applying the phenylhydrazin test, the test tube after boiling (about an hour) be allowed to cool off slowly in a water bath and to stand for from 12 to 14 hours.

The Hoppe-Seyler Test.—The Hoppe-Seyler test, which depends upon the formation of indigo, is not to be recommended as a final test for glycosuria. It is sensitive to about 0.4 per cent., but the following modification is suggested by Jolles as being of value for a rapid examination as to the

presence of 1 per cent. of sugar or over, on account of the ease and rapidity with which it can be carried out.

Jolles' Modification of the Hoppe-Seyler Test.—Heat 100 C.c. of a 0.5 per cent. solution of ortho-nitro-phenylpropiolic acid in soda solution and water in an Erlenmayer flask to the boiling point. Then add the urine under examination drop by drop from a burette until the liquid shows a clear blue color. If 3 C.c. of urine or more are required to produce the blue color it can be assumed that the urine is free from 1 per cent. or more of sugar. If a decidedly blue coloration is developed with from 0.1 to 0.5 C.c. of urine, it may safely be stated that (the above exceptions being noted) 1 per cent. or more of sugar is present.

Fehling's Test and Sulphonal.—Ph. Lafon considers an error in the detection of sugar in the urine of persons under treatment with sulphonal. Fehling's solution, under such cases, may give a strong yellow precipitate, though the same urine if examined with the polari-saccharimeter under yellow monochromatic light, gives no dextro-deflection, the characteristic of diabetic sugar, but a faint deflection to the left.—Chem. News, 1895, 245 ; see also, Compt. rend., 1895, 933.

Analysis of Urine.—A. Heinebuch.—Fehling's solution fails to detect suger when the amount of the latter falls below 0.05 per cent., but Bœttger's test (alkaline bismuth solution) still gives a good reaction with solutions containing as little as 0.25 per cent. The most delicate reaction is obtained by the phenylhydrazine test, which detects as little as 0.01 per cent. of diabetic sugar. When using the polariscope, the urine should be decolorized with basic lead acetate, and not with animal charcoal, as this also removes some of the sugar. For the detection of albumen, the author uses the reaction with acetic acid and potassium thiocyanate, in preference to the one with acetic acid and potassium ferrocyanide. Both tests indicate as little as 0.006 per cent. of albumen, whilst the test with succinic acid and potassium ferrocyanide is only obtained with 0.007 per cent., and the nitric acid test with 0.01 per cent.—Chem. Centr. 1894, 115.

Errors in Testing for Sugar in Urine.—G. Johnson indicates some of the common sources of error in testing for the sugar in the urine. Normal urines contain uric acid and kreatinin, which resemble glucose in their power of reducing copper oxide. A highly albuminous urine boiled with KOH (Moore's test), resulted in producing a dark color from the combination of the sulphur of the albumen with the Pb in an impure specimen of KOH. G. Stillingfleet Johnson has devised a method for the separation of kreatinin from urine, being done entirely by fractional precipitation with mercuric chloride. This urinary kreatinin seems to possess entirely different properties from any of those given under kreatinin, it being much more active in its reducing power.

Picric acid has the advantage that it is not affected by uric acid, it

being a colorimetric test. The reducing action of kreatinin : glucose = 1.2 grain per fluid ounce : 1 grain per ounce. Patients taking salicylate of soda invalidate this reaction so that a urine may behave as if it contained one to two grains of glucose per ounce. Chloral hydrate and chloroform do not affect the picric acid test, although they influence the cupric oxide test.—Pharm. Jour. Trans., 1894, 24.

A New and Sensitive Reagent for Glucose is proposed by J. Gaube (L'Union Pharm., 1894, 197). It is composed of 1 part of chemically pure red cyanide of potassium, 20 parts of soda solution (of the soap-makers'), and 2000 parts of distilled water. It is stated that 0.00015 Gm. of pure glucose decolorizes exactly 1 Gm. of the freshly-prepared test-solution.—See Compt. rend., 1894, Sept. 3.

The Polarimeter in Urine Analysis.—Abnormal urines often rotate the plane of polarization, sometimes to the right, sometimes to the left. According to Haas, the following substances in the urine cause left-handed rotation : Glycuronic acid, phenyl- and in-doxyl-glycuronic acids, leucin, tyrosin, albumen, peptone, hemalbumoses, cystin, cholesterin, aspartic acid, levulose, pseudo-butyric acid. Dextrose is the chief and almost only substance responsible for dextro-rotation.—Apoth. Zeit., 1894.

Bottger-Almen's Method for Determination of Glucose in Urine.—A. Daiber considers this the most satisfactory method now in use. The reagent employed is made as follows :

Sodio-potassic tartrate	4 Gm. [1 dram.]
Soda solution, 8 per cent	106 Gm. [3 fl. oz.]

Bismuth subnitrate a sufficient quantity.

Warm the solution and add the bismuth salt to the point of saturation.

About 20 drops of this reagent are added to 10 C.c. of the urine to be examined, and the liquid is boiled for several minutes. If there is glucose in the urine, a dark yellow or yellowish-brown color will appear at first, which gradually darkens and finally becomes black and opaque. In case a minute quantity of sugar be present, the urine does not turn black, but merely darkens. This bismuth test, as easy in application as it is simple, is very delicate, and will show reaction in urines containing but 0.05 per cent. glucose. Uric acid, kreatinin, mucus, and very small quantities of albumin, do not react with this bismuth solution. Larger amounts of albumin produce, however, by the blackening of bismuth, an illusion avoidable by previous coagulation of the albumin. The presence of idoxyl-sulphuric acid—the so-called indican — is a disturbing factor in this reaction. When it is present more abundantly (which fact need by no means be of any pathological significance), the capacity of reduction imparted to the urine will be vigorous enough to reduce the bismuth solution most energetically. The author enjoins, therefore, all those who investigate glucose with a bismuth solution, and have no polarizer, not to omit the

fermenting test, if a reliable test is wanted. The presence of indican may readily be ascertained according to Jaffe's test,—HCl + urine + chloroform.

It remains to be mentioned that the uro-chloralic acid developed after chloral medication, also possesses a reduction power.—Amer. Drug., and Pharm. Rec., 1894.

Chrysophanic acid produces, with Fehling's solution, a precipitate similar to cuprous oxide, and is therefore apt to be a source of error in testing urine for sugar with Fehling's solution. Chrysophanic acid is generally present in urine voided after the ingestion of rhubarb; and in such cases it is advisable to previously treat the urine with lead subacetate in the usual way.—Pharm. Centralh., 1895, 753, and Bull. Chim. farm., 1894, 609.

Camphor as a Reagent for Sugar.—Neitzel (Deutsch Zuckerind, 1894, 254) recommends camphor instead of alpha-naphthol as a reagent for sugar. Camphor will detect the smallest quantities of sugar in commercial investigations, and is not, like alpha-napthol, affected by the presence of small quantities of nitrates.

Cyano-Cupric Test.—A. W. Gerrard gives the following further information regarding this test:

The method is based on the following facts:

If to a soluton of copper sulphate a solution of cyanide of potassium is added until the blue color is just gone, a double cyanide of copper and potassium is formed, as follows:

$$CuSO_4 + 4KCy = CuCy_2,2KCy + K_2SO_4.$$

This double cyanide is a salt of considerable stability. It is not decomposed by alkalies, sulphuretted hydrogen or ammonium sulphide. With mineral acids it gives a whitish curdy precipitate. If in place of a solution of copper sulphate the cyanide be added to Fehling's solution, the blue color vanishes and the same double cyanide is formed, but the product when boiled with reducing sugars gives no precipitate of cuprous oxide. If, however, the Fehling's solution be present to double the amount decolorized by the cyanide, the mixture will now be blue and suffer reduction when boiled with glucose, giving no precipitate of cuprous oxide, but a steady disappearance of blue color, behaving in this respect like Pavy's solution.

In the original paper (Yearbook, 1892, 400) a formula was given in which Fehling's solution of double the usnal copper strength was used, adding to it enough cyanide of potassium, of specified strength, to decolorize half the copper. This method, which proved troublesome, has now been discarded for the more simple and accurate one which follows: 10 C.c. of Fehling's solution, or 5 C.c.m. each of the separately kept solutions

of copper and alkali, are placed in a porcelain dish with 40 C.c. of water, then boiled. To the hot mixture add steadily from a pipette some 5 per cent. solution of potassium cyanide until the blue color just fades, or a very faint blue color only remains. Excess of cyanide must be carefully avoided. A second 10 C.c. of the Fehling's solution is now added, and while the mixture is kept boiling run in the solution of urine or sugar from a burette, until the blue color is gone. It is important to keep the mixture well boiling, to add the urine steadily, and watch sharply for the change. The volume of fluid in cubic centimeters used to remove the color will contain 0.050 Gm. of glucose, so that if 10 C.c. be used the amount of sugar present is 0.5 per cent. Solutions containing above 0.5 per cent. of sugar should be diluted ten times before testing, and the resulting figures multiplied by 10.

Those who are accustomed to frequently examine diabetic urines are well aware of the difficulty of determining small amounts of sugar by Fehling's test with anything like satisfaction. The copper gets into an extremely fine and yellow colored condition almost impossible to filter off, making it extremely difficult to judge of the end reaction. In such cases the cyano-cupric test will be found very useful. Further, it has the advantage over the ammonia test, in that there are no fumes to annoy the operator, and the boiling may be done in an open dish.—Pharm. Jour. Trans., 1895, 913.

Serum-Globulin—Reducing Substance from.—K. A. H. Mörner.—Serum-globulin, precipitated either by the acetic acid or magnesium sulphate method, and heated in the water-bath with 3–5 per cent. hydrochloric acid, yields a substance which reduces Fehling's solution. Serum-globulin coagulated by heat, also that from morbid urine and ascitic fluid, behaves similarly. Myosin, vitellin, crystallin, fibrinogen, serum albumin, and egg-albumin do not. Fibrin obtained by whipping blood yields a reducing substance, due, probably, to entangled corpuscles. The reducing substance yields an osazone melting at 170°–172°, is optically inactive, and only feebly reduces alkaline bismuth solutions.—Chem. Centr., 1894, 333.

Estimation of Total Sulphur in Urine.—H. Schulz.—The usual manner of estimating the total sulphur in urine is to evaporate to dryness, and fuse the residue with sodium carbonate and nitre. There is probably loss in this way from the passing off of sulphurous anhydride. The method here described obviates this difficulty by collecting in water all fumes during evaporation and fusing. The apparatus devised for this purpose is figured.—Pflüger's Archiv., 1894, 57; Jour. Chem. Soc., 1894, 476.

Action of Iodine and Potassium Hydroxide on Uric Acid.—E. Bryk.—Kreidl has described a method for the estimation of uric acid by treating it with potassium hydroxide and iodine, and subsequently titrating with thiosulphate. The author finds that the action of iodine on a solution of

uric acid, to which potassium hydroxide has been previously added, depends on the proportion in which the substances are present, and also on the temperature. If only a small excess of potassium hydroxide is employed, say in the proportion of 2.25 mols. to 1.3 atoms of iodine and 1 mol. of uric acid, and the mixture is kept cool, a yellow insoluble substance separates. This, on analysis, gave the numbers C = 28.37 — 26.86, H = 4.39 — 3.71, M = 28.53 — 29.19, and on solution in potash or sulphuric acid and subsequent re-precipitation with water, gave uric acid. When a similar mixture is warmed, potassium urate, carbonic anhydride and ammonia are formed. The employment of a larger proportion of potassium hydroxide, say 4 mols. to 2 atoms of iodine and 1 mol. of uric acid, gives rise to allantin and carbonic anhydride; the yield of the former is good (40–50 per cent.).—Monatsh. f. Chem., 1894, 519.

Pigmentation of Uric Acid Crystals Deposited from Urine.—A. E. Garrod.—Of the true urinary pigments which exist ready formed in urine, only the normal yellow pigment (urochrome) and uroerythrin appear to possess the property of coloring uric acid crystals deposited from their solutions. The yellow pigment being a constant constituent of urine always furnishes the ground tint of the crystals, and plays the more important part in determining their form, the whetstone or canoe shape being specially the one produced. In the majority of instances, uric acid crystals which are spontaneously and rapidly deposited from urine, contain uroerythrin also, to which they owe their red color when seen in bulk. It is, however, nearer the sole coloring matter in these sediments, and varieties of tint are due to differences in admixture of it with urochrome. The minute quantity of iron present in the crystals is a constituent of neither pigment. Urobilin and hæmatoporphyrin take no part in the coloration of the crystals, but other pigments occasionally present in urine may share in the coloration, such as the brown products caused by the action of mineral acids, the oxidation products of phenol-derivatives, and the pigments of the bile.—J. Pathol. and Bacteriol., 1894, 100; Jour. Chem. Soc., 1895, 55.

Piperazine as a Solvent of Uric Acid Stones in Urine.—J. Fawcett.—An aqueous solution of piperazine dissolves uric acid stones, but a solution of this substance in urine of the strength of 1 in 1000, which is above that usually found in the urine after taking the drug internally, has no effect whatever.—Brit. Med. Jour., 1894, 1426; Jour. Chem. Soc., 1895, 56.

Table for the Estimation of Urea by Riegler's Method.—L. Vanino.—This is a table for the reduction to Mgms. of urea of the volume of gas ($CO_2 + N$) evolved by the action of Millon's reagent.—Zeit. f. anal. Chim., 1895, 55.

Uroerythrin.—A. E. Gerrod.—The coloring matter of pink urate sediments has been termed uroerythrin, but its nature has never been satisfac-

torily determined. B. Mester's opinion that it is a scatole derivative is considered to be untenable.—Jour. f. Physiol., 1895, 439; Jour. Chem Soc., 1895, 315.

Estimation of Xanthine-like Substances in Urine.—M. Krüger and C. Wulff.—The new name alloxuric substances is suggested for those of the uric acid group. The alloxuric bases, which occur in small quantities in urine, are xanthine, guanine, hypoxanthine, carmine, paraxanthine, and heteroxanthine; a specific reagent for their precipitation is a mixture of copper sulphate with sodium hydrogen sulphite, but it also precipitates uric acid. 100 C.c. of urine is precipitated with 10 C.c. of these reagents, and the precipitate allowed to collect for two hours. Uric acid is separately determined in another sample of urine. The absolute amount of the nitrogen in this precipitate varies from 2.6 to 8 Mgms. per 100 C.c. of urine, the average being 4.53. The proportion of uric acid nitrogen to the nitrogen of the alloxuric bases varies from 2.1 : 1 to 7.6 : 1. The mean of 19 analyses gives 3.82 : 1. The average uric acid nitrogen in the 24 hours is 0.2333 Gm.; and of nitrogen in alloxuric bases, 0.0481 Gm.—Zeit. f. physiol. Chem., 1894, 176.

Bacteriology.

Typical Bacilli.—E. Klein (Quart. Jour. Micros. Sci., 1894, 1–9 [1 pl.]) concludes from observations on the bacilli of anthrax, diphtheria, and tubercle, that these species are not such typical bacilli as they are usually represented to be. For though under many conditions their morphological characters are those of typical bacilli, yet under others they revert to or assume forms indicating their relationship to Saccharomyces or a still higher mycelial fungus. In the case of anthrax, the typical bacilli may be represented by oval and spherical bodies, some of which may contain vacuoles, and under conditions (early stages of growth on plates composed of beef bouillon, gelatin 10 per cent., pepper 1 per cent., salt 1 per cent.), the colonies are composed of large spindle-shaped, spherical or oval elements in which vacuolation is frequent. Similar appearances are to be observed in colonies of the thrush fungus. From this it is inferred that while *B. anthracis* is a typical bacillus as a pathogenic microbe, yet in its early stages of growth on gelatin it may assume characters having much resemblance to *Saccharomyces mycoderma* or *Oidium*, and thus return temporarily to an atavistic stage in its evolutionary history. With regard to *B. diphtheriæ* the author points out that the club-shaped expansions of one or both ends are not to be regarded as due to involution, for both under natural and artificial conditions where there is active growth these expansions will be found, and have, moreover, a striking resemblance to the ends of growing hyphæ. Their existence, therefore, is only to be explained by their representing a relationship to a mycelial fungus. In the

case of the tubercle bacilli, preparations not unfrequently show threads or filaments composed of unequal elements, some of them being conspicuous for the knob-shaped expansions, similar to those of diphtheria. Such appearances occur not only in sputum but in artificial cultivations, e. g., glycerin agar after some weeks incubation at 37°. All these preparations behave in the same way as *B. tuberculosis* when treated with appropriate staining reagents; and that they are not involution forms is evident, as the unbranched nature of the filaments and the existence of lateral bulgings prove that they are in an active condition of growth.

Staining Micro-Organisms in the Blood.—H. Vincent describes a staining process applicable to every variety of micro-organism occurring in the blood. It is based upon the principle that coloring matters fix themselves to the hæmoglobin and not to the protoplasm. If, therefore, the hæmoglobin be removed, and the stain then applied, the blood globules remain uncolored, whilst the microbes are colored and stand out with great clearness. The blood is spread in a thin layer and slowly dried, after which it is treated with the following solution, which dissolves out the hæmoglobin: Aqueous 5 per cent. carbolic solution, 6 C.c.; saturated solution of sodium chloride, 30 C.c.; glycerin, 30 C.c. Filter before use. From half a minute to two minutes suffices for this fluid to act, and it is then drained off, the blood washed with distilled water, and staining effected with carbolized methylene blue, to which from 1 to 20 per cent. of aqueous methyl-violet solution has been added.—Medical Press, cix, 10; Pharm. Jour. Trans., 1894, 73.

Effect of Fabrics on the Vitality of Microbes.—A. D. Nikolski (Wojennomedizinsky Journal) has endeavored to ascertain to what extent the physical properties of materials can be regarded as favorable to the extension of the life of micro-organisms. Experiments show that in coarse, rough and porous stuffs, micro-organisms retain their vitality longer than in more compact and smoother. The explanation is that the thick and porous stuffs can absorb more moisture and retain moisture longer than thin, smooth and compact textures. Further, materials which, after infection, are exposed to light, furnish a smaller number of colonies than those which are secluded from light, and vitality ceases more quickly. These experiments were made with Staphylococcus aureus, the bacterium of typhus abdominalis and the cholera bacillus.—Drug. Circ., 1895, 131.

Effect of Metals on the Growth of Bacteria.—Meade Bolton (Int. Med. Mag.) states that from experiments made by him it is evident that certain metals have at least no marked effect upon the growth of the bacteria tested (there was no special selection of cultures), and it is notable that it is precisely those metals that are resistant toward chemical reagents in general which fail to show any reaction, or do so only to a limited extent.

On the other hand, metals that are readily attacked by chemical reagents all exhibit a marked inhibitory action upon the growth of the bacteria. The effect is, therefore, probably due to a solution of the metal in the medium, and putting bits of metal on the cultures is really equivalent to the addition of a small amount of that salt of the metal formed by the action of the nutrient medium. Traces of the metal may, moreover, be detected by chemical reagents in the nutrient medium surrounding the metal. In many cases a chemical test was not necessary, for the discoloration of the medium alone sufficed to show that the metal had gone into solution, and with the copper and brass foils, there were visible holes dissolved out of the metal. Behrens states that the solution of the metal is more or less affected by the products of the growth of the different bacteria. However this may be, some metals are dissolved out in sterile media, and may be detected by chemical means.—Ibid., 106.

Preparation of Culture Media.—J. L. Smith (Brit. Med. Jour., 1894, 1177) points out the difficulty bacteriologists have to contend with in the fact that the composition of many of the media used for cultivations of pathogenic microbes differs so widely from that of the blood and other fluids found in the animal tissues. He describes a method by which media can be prepared directly from these fluids by a process which reduces the difficulties of manipulation to a minimum.

Break up the white of a hen's egg with an egg-beater till it loses its consistency; add 40 per cent. of water and mix well; pass the mixture through muslin to remove any shreds of insoluble material; add 0.1 per cent. of caustic soda, and solidify in the autoclave. With a little care in clearing it, a jelly of egg-white can be obtained which closely resembles gelatin in consistency. Substances like glucose can be added if desired. A large variety of bacteria have been found to grow on this medium with great readiness.

Bacillus on Plants.—Prillieux and Delacroix (Compt. rend., 1894, 668) describe a disease of various cultivated plants produced by a bacillus about 1.5 μ long and 0.33—0.5 μ broad, closely resembling that already described as bacillus caulivorus. It was observed on the potato, pelargonium, clematis, begonia and gloxinia.

Vibrio Terrigensis.—Karl Günther is reported to have discovered a new bacillus, which differs from the comma bacillus in that it exists in the soil, and not in water or the organs of the human body. He has named it the vibrio terrigensis, and says so far as he knows it is perfectly harmless.—Brit. and Col. Drug., 1894, 211.

Organisms which Produce Sugar and Alcohol.—Went and Prinsen-Geerligs, in Deutsch. Zuckerind., report the isolation of the following new micro-organisms in the course of their studies on the rational manufacture of rum.

(1) *Chalmydomucor Oryzæ*, a mould, similar to that described by Calmette, from the so-called Chinese yeast. It contains a saccharifying non-dialyzable enzyme, and this, on access of air, converts starch into glucose; dextrin and amylodextrin are likewise converted into glucose. Saccharose serves as a nutrient for the organism, but is not inverted. The glucose which is formed is non-fermentable. Closely related to the organism just mentioned and perhaps only a sporangium-bearing form of the same is rhizopus oryzæ, which occurs on rice-straw and behaves in a manner analogous to the organisms first described.

(2) *Monilia Javanica* in access of air ferments glucose, fructose (levulose), maltose, raffinose and saccharose (which it first inverts), but not milk-sugar; fermentation proceeds but slowly, and when the concentration of the sugar solution is above 9 per cent, it is not complete.

(3) *Saccharomyces Vordermannii.* — This yeast ferments the same sugars as the one just mentioned, but fermentation proceeds readily and is complete when the concentration of the solution is as high as 18 to 19 per cent. The products of the fermentation are carbonic anhydride, traces of succinic acid, glycerol, ethyl acetate and aldehyde; the alcohol produced is very pure, free from fusel oil and acids, and has an excellent flavor and aroma. The authors have obtained pure cultures of this yeast, which appears to have an important practical value.—Pharm. Era, 1895, 303.

"*Bacillus No. 41.*"—Conn (Pharm. Era, 1895, 364) has discovered a species of bacterium, to which he has given the name of "Bacillus No. 41," and which has given the most promising results, as an organism for the artificial ripening of cream, and butter-making. These experiments, as carried on by him, were thoroughly satisfactory, and were made in the following manner: One-half of a pint of milk was sterilized, by incessant steaming, during a period of three or four days. Then this Bacillus No. 41, which had been cultivated, was inoculated into the milk, and for two days was allowed to develop. A large creamery was then visited, and six to eight quarts of cream were put into a metal vessel and "pasteurized." The cream was then heated to 158° F., and left for ten minutes. The vessel was removed and cooled quickly by means of cold water, and when the temperature had dropped to 80°, Bacillus No. 41 was poured in and the mixture stirred thoroughly. The vessel was then covered and put into the ripening room. After a couple of days the cream was churned, and the buttermilk remaining was set aside for future use. These six quarts were ripened for the purpose of increasing the number of bacteria, and securing a strong culture for use in the large cream vat of the creamery. The buttermilk was then inoculated into the day's cream supply, and this cream allowed to ripen in regular time, at a warm temperature, and churned as usual. Before churning, a quantity was set aside to use for in-

oculation in the next day's supply, and in this manner continued indefinitely. The effect was always uniform. The first six quarts of cream produced moderately good butter, but not quite of the flavor wanted. The first large churning was a trifle better, and each day's product was an improvement. A delicate flavor also developed, which seemed to deteriorate after two or three weeks. This deterioration was remedied by a fresh inoculation from the laboratory. Two vats of cream, from which June butter was made, were taken. One quantity was inoculated, and the other was not. The butter produced by each was of high quality, but that which had been inoculated with Bacillus No. 41 had an aroma stronger and more pleasant than that without. It was also superior in both taste and odor.

Fossil Microbes.—Reynault and Bertrand stated that in examining sections of coprolites of the Permian period, they noted the presence of a considerable quantity of microbes of different kinds—isolated rodlets and diplo-bacilli, strepto-bacilli, vibrios, and filaments. There were also mucedinea, with mycelium and detached spores. The Permium bacterium is said not to resemble any of the forms known to exist at present. Renault and Bertrand throw out the suggestion that possibly these may be only one species of bacterium which is polymorphic.—Brit. Med. Journal; Brit. and Col. Drug., 1894, 222.

The Action of High Pressures on Microbes.—Roger gives results of two series of experiments undertaken to ascertain the effects of high pressures on micro-organisms. Compressed gases had been found to attenuate and destroy bacteria, but the effects of simple pressure on culture liquids had not hitherto been investigated. An apparatus was first used which permitted shocks of 250 kgms. Under this pressure the staphylococcus aureus, the streptococcus of erysipelas, the coli bacillus, the anthrax bacillus, spore-bearing or not, presented no alteration after the action of five to ten successive shocks. Higher pressures were then tried. The same cultures were submitted to pressures varying from 1,000 kgms. to 3,000 kgms. per square Cm.; that is to say, from 967 to 2,903 atmospheres. Under these circumstances the staphylococcus and coli bacillus showed no modification, but the sporiferous anthrax bacillus was slightly attenuated by a pressure of 3,000 kgms. The non-sporiferous anthrax bacillus supported perfectly 1,000 kgms. but pressures of 2,000 kgms., and especially of 3,000 kgms., caused a large number to perish, and those which survived caused merely a chronic affection in guinea-pigs which developed in 15 to 20 days, whereas in the control animals death ensued in three days. The streptococcus was equally altered by a pressure of 3,000 kgms.; some were killed, and those which remained provoked merely a curable erysipelas, whereas before the compression they set up a fatal septicemia. Hence, there exists a very curious difference between the sensibility of bacteria to the action of compressed gases and their resistance to simple pressure,

such changes of pressure as occur on our globe being powerless to modify their virulence.—Pharm. Era, 1895, March 14.

Bactericidal Action of Light and Air.—R. F. D'Arcy and W. B. Hardy. —Marshall Ward has shown that the bactericidal power of light is a peculiar property of light of short wave length, and is at its maximum at the violet end of the blue. This is only manifested in the presence of oxygen, and Mürster has shown that "active oxygen" is produced when evaporation takes place in direct sunlight. The present experiments show that when the spectrum of a powerful arc light is allowed to fall on a moist surface in the presence of a delicate indicator, oxidation occurs, and the action commences at the blue end of the green, and continues through the blue, violet, and ultra-violet region; in other words, the action is confined to a portion of the spectrum which corresponds with the region of activity in Ward's experiments.—Jour. f. Physiol., 1894, 390.

Disinfection by Exposure to Sunshine.—E. von Esmarch (Zeit. f. Hygiene) has investigated the effects of sunshine as a disinfectant of bedclothing, etc. He refers to experiments of others showing the destructive effect of sunlight on some bacteria, and then reports the results of his own investigations in the line referred to. He exposed to the sunlight pillows made of various materials and infected with bacteria as pure cultures, or pus containing micrococci, imitating the natural conditions of "airing" as far as possible. The materials contaminated with the solutions were placed in the sun, either at once or after drying. Control experiments were made. He arranged wool, cloth, etc., in layers, and in the first series of experiments, to prevent the falling of atmospheric microbes during the exposure, he placed the pieces in a box covered with a glass pane and provided at the sides with openings for ventilation. The temperature of the interior, however, rose much higher than that of the air (30 degrees) and vitiated the results. In subsequent experiments the objects were always placed on the grass in the sun. Esmarch concludes that the sun's rays have a marked action on the surface, but that this speedily becomes lost when bacteria are protected by layers of material. The cholera bacillus, even in the deepest layers, was killed; but this is not surprising, since desiccation, lasting but a short time, is fatal to it. An exposure lasting eight to ten hours yielded but unsatisfactory results. After one day the diphtheria bacillus was killed in the interior of the pillows, but when protected by the woolly hair of a sheep's skin 39 hours were insufficient. Streptococci within the pillows and the skin withstood a five days' exposure. Esmarch then sprayed infected articles with 2 per cent. and 5 per cent. solutions of carbolic acid, and found that the weaker acid is little better than the sun, and that the 5 per cent. is not altogether reliable.—Drug. Circ., 1895, 131.

Acetic Acid as a Germicide.—Abbott and McCormick show that a solu-

tion containing 7 per cent. of acetic acid is more effective as a germicide than bichloride of mercury.—Brit. and Col. Drug., 1894, 520.

Cinnamic Dichloride and Micro Organisms.—A. Starenhagen and H. Finkenheimer, in Ber. d. Chem. Ges., 1894, 456.—Cinnamic dichloride has been partially resolved by Liebermann and Finkenheimer into its officially active components. The present authors have treated 5 Gm. of the dichloride for four weeks with Aspergillus fumigatus and isolated 1.5 Gm. of an acid rotating $[a]_D = -1$. From 6 Gm. of dichloride treated with yeast for three weeks, 2.2 Gm. of an acid was obtained, giving $[a]_D = -2.8$. The organisms had multiplied during the above periods, despite the formation of hydrogen chloride and chlorocinnamene. Blank experiments (without the organisms) showed that while a small quantity of chlorocinnamene was formed, the acid remained inactive.

Chlorolin, a Disinfectant.—Under the name of chlorolin J. Weirich has introduced a fluid disinfectant and antiseptic, consisting chiefly of mono- and trichlor-phenols. It is said to be serviceable for the disinfection and deodorization of water-closets and urinals. For the former, 10 to 20 tablespoonfuls are added to a pail of water and poured down the closet; for urinals, 1 or 2 tablespoonsfuls suffice for a week, and for night chambers and night chairs a few drops of chlorolin are said to be sufficient to remove all foul odor. A strip of paper saturated with chlorolin, hung about the room, will dispel any offensive smell present. Chlorolin is reported to be adapted also to the disinfection of the bed linen and the stools, as well as of the cuspidors used by phthisical patients. In surgery and gynecology, 2 to 3 per cent. solutions of chlorolin are employed; as gargles, ½ to 1 per cent. solutions; by inhalation, a 5 per cent. solution. To moderate the well-known penetrant and sometimes annoying odor of the chlorphenols present in chlorolin, it is recommended to dilute the latter, for the two last-mentioned purposes, with 2 to 2½ per cent. of alcohol. Details concerning the physical and chemical properties of the new disinfectant, and the mode of its preparation, are wanting.—Merck's Market Report, 1895, 88.

Disinfection by Copper Sulphate.—H. Vincent claims that copper sulphate is the best disinfectant for fæcal matters and the contents of cesspools, satisfactory results being obtained in twenty-four hours with 7 Gm. to 8.5 Gm. of the salt per 1000 C.c. of matter disinfected. For typhoid and cholera dejecta 6 Gm. and 4 Gm. respectively per 1000 C.c. sufficed, the comma bacillus disappearing in about twelve hours. The greater the degree of fluidity in the matter to be disinfected, the sooner is the result attained; while a smaller proportion of disinfectant is required in summer than in winter, other things being equal. The presence of alkalies tends to check the action of both copper sulphate and chlorinated lime. For normal excreta mixed with urine it is recommended to employ 6 Gm. of

sulphate per 1000 C.c. to effect disinfection within twenty-four hours; in typhoid cases 5 Gm. per 1000 C.c. should be used; while for cholera dejecta 3.5 Gm. per 1000 C.c. will suffice, twelve hours only being required in the last two cases.—Comp. Rend., cxix., 965.

Dihydroresorcin, an Antiseptic.—Dihydroresorcin is said to be prepared by a patented process as follows: A 2 per cent. sodium amalgam is introduced into a boiling aqueous solution of resorcin simultaneously with carbonic acid gas. The unchanged resorcin having been removed by ether, the mixture is acidulated and the liberated dihydroresorcin shaken with ether; when, after the distillation of the ether, hydroresorcin will remain as a syrupy substance which soon crystallizes. Dihydroresorcin forms shining prisms, M. P. 104°–106° C.; it is freely soluble in water, alcohol or chloroform, but very sparingly so in absolute ether, carbon disulphide or ligroin. It is said to be antiseptic.—Amer. Drug. and Pharm. Rec., 1894.

Disinfection by Formaldehyde Vapor.—Gambier and Brochet publish a suggestive paper on the value of formaldehyde vapor for destroying all dust germs, even anthrax bacillus and its spores, provided that the room be hermetically sealed and the exposure is sufficiently prolonged. Moulds and nonpathogenic forms of bacilli are most resistant, but those causing putrefaction quickly succumb. The penetrating power of the gas was shown in the complete sterilization in twenty hours of dust placed in beakers to the depth of a centimetre, the beakers being placed in a cupboard. Formaldehyde disinfection would be valuable in the case of breakable or precious objects; it has the great advantage over corrosive sublimate spray that it is not necessary to displace the majority of articles. Any germs that escape a first operation are destroyed by a second.—Pharm. Jour. Trans., 1895, 1890.

Disinfecting Action of Guaiacol.—Previous experiments have usually been made with impure guaiacol, but J. Kuprianow has employed a chemically pure sample. (Centr. f. Bak.). As a disinfectant, guaiacol is much weaker than phenol and cresol, and therefore of little use for external application. Especially is this the case with dilute solutions, while with increase of concentration the disinfecting value rapidly increases; by the addition of alcohol, the effectiveness of all known disinfectants is considerably heightened. Bacterial germs are more easily killed than cultures. Guaiacol, like cresol, has a powerful action on tubercle bacilli. By direct action the organisms of Itch (Acarus Scabiei) are almost instantaneously killed, but the action becomes very slow when animals afflicted with itch are treated with guaiacol. While cresol, even on external application, is poisonous on account of rapid resorption, and hence must be used externally only in very weak solutions, the absence of poisonous and caustic properties in the case of pure guaiacol, on the other hand, allows of its

internal application. Internal treatment of cholera with guaiacol might, perhaps, be worth trying, as a solution of 1 in 500 of this reagent completely prevents the development of the cholera bacillus.—Pharm. Era, 1895.

Disinfection with Iodine.—W. Richardson (Asclepiad, second quarter, 1894–95, p. 157) recommends iodine as a useful disinfectant, which may be used as a solution in spirit, in which rags are dipped and then suspended in the room to be disinfected; or the substance may be employed in the solid form, or in extreme cases in the form of vapor. Used in the solid form, a dram may be placed in a cup, glass vessel, or common chip box, which is covered with a piece of gauze or muslin. The substance soon diffuses through the air of an apartment, which it thoroughly disinfects if organic matter be present. When rapid disinfection is desired the iodine may be placed on a porcelain or a common plate or saucer, and the heat of a candle applied beneath. The vapor of iodine appears to produce little effect on gilded or metallic surfaces, but it stains marble or white painted surfaces when it comes directly in contact with them. It is essential that the ventilation be not neglected in using iodine as a disinfectant. The substance may also be successfully used when the breath is fetid, being carefully inhaled from a small bottle, and avoiding dryness or soreness of the nostrils or throat. It also makes a useful application to fetid and indolent ulcers and sores. For this purpose it may be placed in a chip box beneath the bed-clothes.—Amer. Drug. and Pharm. Rec., 1895, 272.

Methylpyridine Sulphocyanate, an Antiseptic.—In combining quinoline with sulphocyanate (thiocyanic, hydrosulphocyanic, rhodanic) acid, water is separated and methylpyridine sulphocyanate is obtained. With this salt Edinger (Med. Week, iii., 155) made a series of experiments with special reference to its effect on the diphtheria and cholera bacilli and on the pyogenic microbes. It was found that a 1 : 2000 solution kills the cholera bacillus within an hour; a 1 : 1000 solution kills the diphtheria bacillus within an hour; a 3 : 200 solution kills the staphylococcus aureus within an hour. The same result was obtained by exposing, during ten minutes, the cholera bacillus to the action of a 1 : 200 solution of this sulphocyanate, the diphtheria bacillus to a 3 : 200 solution, and the staphylococcus aureus to a 2 : 125 solution.

To kill the same microbes in a minute, a 3 : 100 solution was required for the cholera bacillus, a 9 : 100 solution for the diphtheria bacillus, and a 3 : 100 solution for the staphylococcus aureus. Cultures of the comma-bacillus were prevented by a 1 : 10000, of the diphtheria bacillus by a 51 : 10000, and of the staphylococcus aureus by a 1 : 4000 solution. It is evident, therefore, that this substance is an energetic antiseptic; at the same time, it is not in the least caustic, and absolutely painless on application. It possesses, consequently, great advantages over both carbolic acid and

corrosive sublimate, while it is said to be entirely free from the dangers attending the use of the latter substances. Litten states that he has employed a 1 per cent. solution of methylpyridine sulphocyanate in several cases of gonorrhœa. The patients experienced no pain and recovered promptly, though not more quickly than with other antiseptic agents. This may possibly be due to the fact that the quantity used was very small. —Merck's Market Rep., 1895, May 1.

The Antiseptic Properties of Oil of Cinnamon.—D. Braden Kyle has used the Ceylon cinnamon oil in the treatment of infective varieties of nasal, laryngeal and aural affections, with marked success. He explains the action of the oil as follows: The germ being an albuminous compound, composed mainly of nitrogen, oxygen, and hydrogen, and being enclosed in a capsule of varying thickness, the chemical composition of which is cellulose, when brought into contact with the active principle of the oil, the cinnamic acid, has its cell-wall contracted, which practically deprives the germ of its nutrition. By microscopic examination this theory is confirmed. In cases in which the solution of the oil, 1.500, was put to the clinical test, the wounds healed by first intention. However, it is not a safe antiseptic for surgical work, but it is a good mucous membrane antiseptic. It is not, however, a germicide.—Therap. Gaz., 1894; Amer. Drug. and Pharm. Rec., 1894.

Ozone as a Disinfectant.—Malifut suggests that the solubility of ozone be utilized so as to make the disinfectant qualities of ozone available in the ordinary conditions of the sick room and in hospitals. He finds that 1 liter of water will dissolve 39.4 Mg. at 0°C. 25.9 Mg., at 15°, 13.9 Mg. at 27°, and 0.6 Mg. at 55° C.—Ibid., 1895, 30.

Deodorizing with Ozone.—The advantages of ozone as a deodorizing and purifying agent have led to the construction of an apparatus by Poulsen, which is said to be of peculiar service. It consists of a wide-necked glass jar, with a double cover of porcelain plates, finely perforated; the upper plate closes in the mouth of the jar, while the lower one is inserted in the neck of the jar, about two inches below the other. Through the centre of each of these covers a glass rod passes, terminating at the lower end—which is curved upward—in a small cup for holding a piece of phosphorus: in the jar is placed a given quantity of acidulated water, its level just above the cap containing the phosphorus, which, when the apparatus is not in action, is always submerged. A little permanganate of potash is added to the acid solution, and to produce ozone the phosphorus is raised by means of the glass rod, just to the surface of the water. Now, chemical action produces phosphorous acid in the form of fumes by the contact of the phosphorus with the air, and the fumes are seen to rise to a certain height, when they are deflected down upon the solution, into which they are absorbed, and converted into phosphoric acid by being

oxidized by the permanganate of potash. Meanwhile, ozonified oxygen is produced, and, passing out through the perforations in the covers, is distributed in the atmosphere.—Pharm. Era, 1895, 334.

Antiseptic Phenyl Compounds.—J. Parry Laws and Klew showed some time ago that phenyl-propionic acid is a more powerful antiseptic than phenyl-acetic acid, and the latter more powerful than phenol itself. Laws, with the aid of J. E. Marsh, has prepared a quantity of still higher homologue, phenol-butyric acid, by reducing isophenyl-crotonic acid with hydriodic acid and phosphorus, and made a series of experiments with regard to the restraining influence and the bactericidal power of this antiseptic. The experiments were made with anthrax bacilli as being typical of resistent organisms to extremely adverse conditions. These experiments show that phenyl-butyric acid is still more efficient than phenyl propionic acid, thus indicating that with the increase of molecular weight of the phenyl-substituted acids, the antiseptic value increases. In the case of the unsubstituted fatty acids the converse holds, formic acid being a stronger antiseptic than acetic acid, and this better than propionic acid.—Drug. Circ., 1895, 106.

Sulphuric Acid as a Disinfectant for Cholora-Contaminated Sewage.—M. Ivanov details some experiments he has recently carried out under Pfuhl's guidance in order to study the influence of sulphuric acid on the vitality of cholera microbes living in water. The author employed a 66° commercial sulphuric acid (containing 98.5 per cent. of pure H_2SO_4 and having sp. gr. = 1.84), which he added to samples of water derived from the Berlin and Potsdam town canals, and artificially contaminated with pure cultivations of cholera vibrio, as well as with fæces from cholera patients. The following are the chief conclusions arrived at by the writer: (1) Even in the case of a highly-contaminated canal water, an addition of .08 per cent. of the 66° acid proves sufficient to totally destroy all the bacteria present therein within some fifteen minutes. (2) To secure the result it is necessary that the mixture should show "*a fairly strong acid reaction.*" (3) The method is very cheap, in fact the cheapest after the disinfection by tar. The price of 100 kilogms. of the 66° crude acid does not surpass 6.5 German marks, or 8.13 Bulgarian levas.—Bulgarian Meditzina; Nat. Drug., 1894, 359.

Ptomaine Therapy.—Antitoxins are alkaloidal substances obtained from cultures of pathogenetic bacilli. The pure toxins are first isolated by the aid of the different culture media. These toxins are the poisonous ptomaines of the micro-organisms producing the disease. The administration to animals of these toxins for several days in increasing doses establishes immunity from the disease from which the ptomaines were obtained. From the serum of the blood of such immunized animals a new alkaloid or ptomaine is obtained, called antitoxin, which has been demonstrated to

possess the power of modifying the action of the original disease to such an extent as to be curative and protective. Just how this curative action is established is a matter for further investigation. The modus operandi is probably similar to that of bovine virus in protecting individuals from small-pox. At any rate, the antitoxins do not kill the pathogenetic bacilli, but rather modify their action on the blood and tissues to such an extent as to establish a tolerance which prevents a fatal termination from the invading micro-organisms.

The four special theories which have been promulgated in explanation of ptomaine therapy are briefly these:

(*a*) Chaveau in 1880 brought forth his theory, which supposes that a ptomaine is elaborted in the system of the individual suffering from an attack of an infectious disease. This ptomaine is retained in the body, rendering it immune from a second attack, and also assists the tissues in withstanding the poisonous germs of the original disease.

(*b*) In 1883 Sternberg gave us the acquired or tolerance theory of immunity. The arsenic eaters of the Alps and the morphine users may be cited to show that large doses of deadly drugs may be taken with impunity after a tolerance has been established. So with the toxic effects of the ptomaines of disease—a tolerance may be established.

(*c*) According to Metschnikoff, immunity may be established on the theory of phagocytosis. Phagocytes are fixed endothelia cells, fixed connective tissue cells and wandering leukocytes, which act under the influence of thermotaxis or positive and negative trophotropism, a chemiotaxis or selective influence, whereby certain foreign or toxic bodies are attacked, absorbed or eaten up by these cells. This theory is based upon the fact that anthrax bacilli have been found in the process of digestion in the interior of white blood corpuscles when given to insusceptible animals.

(*d*) The antitoxin theory is similar to that of Chaveau, and not unlike that of Sternberg. Behring and others claim that antitoxic agents form in the body of animals either naturally or in consequence of inoculation with some pathogenic micro-organisms, which in some way neutralize the toxicity of the invading bacilli. Immunity is frequently established by one attack—as in smallpox, for instance. Immunity may be congenital or acquired. Some animals are congenitally immune against certain pathogenic bacilli—such as the dog, which never contracts anthrax. Dog serum is antidotal to anthrax toxin. That is, if a mouse be inoculated with a fatal dose of anthrax toxin, and it also be given a few drops of dog serum, no fatal effect will follow. Similarly, Lizzoni and Cantani have successfully treated many cases of tetanus in the human race by acquired antitoxin ptomaines of the tetanus bacilli. On the same basis rests the present treatment of diphtheria.—Pharm. Era, 1895, 42.

Disease Germs in Bread.—At the late meeting of the British Medical Association it was shown that bread is not sterilized by the heat to which

it has been subjected in the baker's oven. The average temperature in the centre of a quartern loaf does not exceed 186° F., and in a half quartern loaf 203° F. An eminent medical contemporary justly observes that this fact is a weighty reason for the improvement of the sanitary condition of bakeries.—Chem. News, 1894, 198.

Cancer Antitoxic Serum.—Richet recently presented a report of the successful treatment of two cases of cancer by means of an antitoxic serum prepared as follows: An osteo-sarcoma of the leg was removed, the tumor well rubbed up in a mortar with a little water, the liquid filtered through linen and injected into three animals (an ass and two dogs). This injection was not followed by any reaction, and in five, seven and fifteen days afterward the blood was drawn and the serum separated. It was this serum that he used in the cases in question.—Amer. Drug. and Pharm. Rec., 1895, 308.

An Ammonia Bacillus.—Vander Mack states that the development of ammonia in distilled water is due to a bacillus which he terms the "*Bacillus ammoniacogenes.*" Fortunately this bacillus is very sensitive to the influence of daylight, and distilled water can thus easily be protected by exposure to sunlight.—Ibid.

The Comma Bacillus in Relation to Cholera.—According to Grimbert, the most certainly Asiatic comma bacillus cannot occasion cholera, unless it finds in the organism an especially favorable medium. A factor still unknown must therefore intervene, perhaps another microbe, the association of which with the comma bacillus is necessary to occasion the disease. But until this hypothesis is verified, we are forced to recognize that Koch's comma bacillus has lost a part of its importance, since it may circulate in the water without bringing the cholera, and may swarm in the intestinal canal of man without occasioning choleraic symptoms.—Jour. de Pharm. Chim., 1894, 388.

Comma Bacillus.—Günther (Apoth. Zeit., 1894; Brit. and Col. Drug., 1894, 261) deals with the separation and identification of a comma bacillus from the earth. Up to the present no comma bacillus has been known otherwise than those existing either in the human organism or at times in other animals, in fæces and in water; this being the first found normally in soil.

Cholera Bacillus and Tobacco.—Wernicke states that the cholera bacillus speedily perishes on tobacco leaves, even when moist, and that, therefore, any danger of the spread of cholera from tobacco or cigars is but slight.—Jour. R. M. S., 1894; Centralbl. f. Bacterial. u. Parasit., 1894, 898.

Djambo, a Javanese Cholera Remedy.—The leaves and bark of djambo tree are infused with rice and nutmeg by the Javanese and the infusion is administered in the diarrhœa of cholera. Several trees are known by the name of djambo in Java, but according to Sobreder, the tree referred to

in this connection is the Myrtacea *Psidium Guajava Reiddi*, which is indigenous to tropical America, and is cultivated in Java. It is a styptic and stomachic.—Amer. Drug. and Pharm. Rec., 1894.

Anti-cholera Inoculation.—Haffkine's experiments in preventive inoculation against cholera are being carried out on a large scale in India, some 20,000 persons having, so far, been inoculated. The results, so far as reported on, do not appear to be conclusive, but on the whole it seems that the inoculations do confer a real immunity, but that the protecting influence is not exerted until several days after the inoculation, and then increases from day to day. How long the immunity lasts cannot yet be stated. The experiments will be continued for some time.—Ibid.

Serum Treatment of Cholera.—Freymuth (Deut. med. Woch., Oct. 25, 1894) has treated three cases of undoubted cholera by the injection of serum obtained from patients who had recently passed through an attack of the disease. Of these three cases, two recovered. In the fatal case death was due to a mixed infection, as the bacteriological examination showed. In one case, particularly, the patient rapidly improved after the injection. The numbers, are, of course, too small to base conclusions upon. The serum was used in doses of 10, 30, or even 50 C.c. It was shown to protect guinea-pigs against injections of virulent cholera bouillon. The treatment is easily carried out and is without danger. The serum should be taken from those who have had a severe attack of cholera.—Ibid., 1895, 10.

Antitoxin Treatment of Diphtheria.—Antitoxin, as at present prepared, is the diseased, the poisoned serum of a horse's blood. First the diphtheria bacillus is cultivated for some weeks in bouillon, and an attenuated, but deadly virus is filtered off from the cultivation. This poison is injected in the horse's blood, at intervals of a fortnight or so, at first in minute doses which are gradually increased. In two or three months the horse can bear a dose which would at first have been certainly fatal to him, and ultimately becomes completely immune. Blood is then drawn from his veins, the serum is separated and bottled, and it is claimed that this being injected in certain doses into the blood of a diphtheria patient conveys its own immunity to that patient. A very important claim is put forward: that a single inoculation of the serum in a healthy person confers a sufficient immunity to protect the attendants on a diphtheritic patient from infection. The remedy is certainly not an agreeable one, but it is better than the disease, and so far as it has yet been tried, it must be admitted that a promising degree of success has been reported. No dangerous effects have as yet been observed. Behring of Berlin appears to be entitled to the honor of having initiated and worked out this method of treatment, and Kossel, Ehrlich and Aaronson of the same city were the practitioners whose clinical observations with the antitoxin first attracted

attention. Roux's paper before the Buda-Pest Hygienic Congress brought the cure into prominence.—Chem. and Drug., 1894, 644.

The Preparation of Diphtheria Antitoxin by Electrolysis.—Smirnow gives, in the Ber. Klin. Wochensch., No. 30, 1894, an account of experiments which he has made on the preparation of antitoxin by electrolysis, in the hope that this method might supplant the tedious and expensive method of animal immunization. After injecting a dose of pure bouillon-culture of diphtheria, which proved fatal in a control experiment, into guinea-pigs, he employed bouillon-cultures through which a current of electricity has been passed, as a heilserum, with successful results. He is hopeful that the serum prepared by electrolysis may be effective in the human subject.

The Dose of the Diphtheria Antitoxin.—Roux states (Medical Record) that his practice has been to give 20 C.c. (over 5 drachms) to each little patient on admission, and the same quantity or half the same quantity, according to the severity of the case, twenty-four hours afterward; and if the pulse and temperature still remain high, the same dose is again given. He adds that the smallest quantity he has used has been over 5 drachms, and the largest quantity about 4 ounces; in one exceptional case as much as between 6 and 7 ounces. Practitioners should remember these facts, and that Roux's series of cases is by far the largest and most important hitherto published.—Amer. Therap., Jan. 15, 1895.

Roux's Blue.—The solutions used for staining the diphtheria bacillus by the Loeffler-Roux method are prepared as follows (L'Union Pharm., 1894, 466):

(*a*)—Dahlia violet	1 part.
Alcohol (90 per cent.)	10 parts.
Distilled water	89 parts.
(*b*)—Methyl green	1 part.
Alcohol (90 per cent.)	10 parts.
Distilled water	89 parts.

For use, mix 1 part of solution *a* with 2 parts of solution *b*.

Loeffler's Toluol Solution.—Despite the fact that antitoxin is the coming remedy for diphtheria, this solution, proposed by the discoverer of the diphtheria bacillus, is a useful adjunct in the treatment, and is also serviceable in suspicious cases, and in various non-diphtheric inflammations. The formula is as follows:

Menthol	10 Gm.
Toluol sufficient to make	36 C.c.
Alcohol	60 C.c.
Solution of ferric chloride	4 C.c.

The application is made by first cleansing the affected parts with a

cotton swab, held by forceps, and then in a similar manner applying the solution with a freshly-saturated cotton swab.

Precautions must be taken against infection from the sudden coughing of the patient, which is liable to occur as a result of the application.—Amer. Jour. Pharm., 1895, 155.

Diphtheria Treated with Papayotin.—Harmann (Pharm. Ztsch. f. Russl., xxxiii, 677) reports that he has for over a year obtained striking results with papayotin in diphtheria, not one of his patients having died. A simple 1 to 1½ per cent. solution of papayotin in 4 per cent. aqueous carbolic acid solution was used every ten minutes for painting the white spots in the throat. Sodium salicylate was administered internally, and sometimes the neck was anointed with mercurial ointment three to four times a day.

New Researches on the Micro-organisms of the Soil which Fix Nitrogen.—M. Berthelot's results, which are given in a series of tables, and which are very decisive, have received a striking confirmation by the researches of Minogradaky. This savant has obtained a large bacillus, which determines the fixation of nitrogen in media previously free from that element.—Bull. Soc. Chim., vols. xi.–xii., No. 15.

On Certain Variations of Pneumobacillus Liquefaciens Bovis, the Microbe of the Contagious Peripneumonia of Oxen—S. Arloing.—There are two varieties of the pneumobacillus, and not two distinct micro-organisms. The pathogenic properties of the non-liquefying variety are less accentuated.—Compt. Rend., vol. cxix., No. 3.

Experimental Production of the Contagious Peripneumonia of Oxen by Means of Cultures—Demonstration of the Specific Character of Pneumobacillus Liquefaciens Bovis.—S. Arloing's experiments enable him to affirm decisively that the virulent agent of contagious perepneumonia is an ordinary microbe, and that this microbe is the Pneumobacillus liquefaciens bovis.—Compt. Rend., vol. cxix., No. 2.

Ptomaine in Pleurisy.—A. B. Griffiths extracted a ptomaine from the urine of patients suffering from pleurisy by the following method: (*a*) A large quantity of urine was made alkaline by the addition of sodium carbonate, and then agitated with half its volume of ether. (*b*) The ethereal solution (after standing) was filtered and agitated with a solution of tartaric acid. The tartaric acid combines with any ptomaine present, forming a soluble tartrate, and the tartrate solution forms the lower layer of the liquid. (*c*) The tartaric acid solution (after being separated from the ether) was also made alkaline by the addition of Na_2CO_3 and was once more agitated with half its volume of ether. (*d*) The ethereal solution (after standing) was separated and the ether allowed to evaporate spontaneously. (*e*) The residue (after drying over H_2SO_4) was treated with water, an excess of pure $Ca(OH)_2$ added and the mixture evaporated on

a water bath. The residue so obtained was treated with chloroform and filtered. The filtrate (after evaporation) yielded the ptomaine in an isolated and a crystalline condition.

The ptomaine called *pleuricine* is a white crystalline substance with a slight hawthorn-like odor. It is readily soluble in water. Forms a crystalline salt with HCl. Nessler's reagent gives with it a pale yellow ppt., which darkens and becomes brownish on standing, the liquid appearing pinkish by transmitted light. The ppt. on heating is destroyed or redissolved, and the solution becomes colorless. Ferric chloride produces a white ppt. It is affected by potassium-cadmium iodide (Marmé's Test), potassium-bismuth iodide (Dragendorff's Test), phosphoantimonic acid and phosphotungstic acid. The formula of *pleuricine* is $C_3H_5O_2$ and is toxic to smaller animals. It does not occur in normal urine.—Chem. News., 1894, 199.

An Antitoxin for Syphilis.—J. Duncan Menzies writes to the Brit. Med. Jour., for March 2, that the satisfactory results of the antitoxin treatment of diphtheria encourage one to hope for a still more brilliant advance in scientific medicine. He refers to the possibility of obtaining a seropathic antitoxin for syphilis. The horse, he says, is known to be subject to a constitutional affection having a marked likeness to the human disease, without, perhaps, a real identity. Again, human syphilis, he says, is incapable of being transmitted to the equine genus. Can we regard this last fact, he asks, as showing a species of antagonism between the two diseases? The bacteriology of equine venereal disease has not as yet, he believes, been worked out. It would be instructive, he thinks, to compare and endeavor to form an estimate of the bacteriological strength and antagonism of the two viruses, if possible. This discovery, he says, if properly substantiated, might lead to the perfected therapeutic syphilotoxin.—Amer. Drug. and Pharm. Rec., 1895, 272.

Thermophilic Bacteria.—A Macfadden and F. R. Blaxall have made experiments with a view to studying the range of temperature at which it is possible for bacteria to grow. After inoculating agar-agar with garden soil, they found that an abundant growth of bacteria was obtained at the comparatively high temperature of 60°–65°C. To such organisms the term "thermophilic bacteria" is applied. They are widely distributed in nature, being found in fæces sewage, Thames water and mud, surface soil, and soil at a depth of five feet. Dust from the streets invariably contains them, and they are also present in sea water. In fact, they may almost be termed ubiquitous. About twenty different forms of thermophilic bacilli have been isolated, all, with one exception, being spore-bearing organisms. They will not grow at or below blood heat. Some liquefied gelatin, others did not. A number of them curdled milk, and one converted starch into sugar. In broth and agar cultures putrefactive decompositions took place, iodol and sulphuretted hydrogen being produced. The organisms

also produced an active decomposition of meat and blood albumin, and several of them produced a fermentation of cellulose. They are said to exercise perfectly all the functions common to saprophytic organisms at 60° to 65° C., that is to say, at a temperature which is usually fatal to the life of cell protoplasm.—Brit. Med. Journ., 1894, 644.

Vitality of Typhoid Bacilli. — J. Uffelman (Centralblatt für Bakteriologie, etc., Feb. 5, 1894), found that typhoid bacilli withstand drying for a month at least, and in some cases (in dirt, sand, cloth, etc.) they retain their vitality for several months. This corroborates the general view.

Disinfection of Tuberculous Sputum.—J. J. Goriansky contributes to the Archives des Sciences Biologiques of St. Petersburg the results of a study of the effects of disinfectants on tubercle bacilli in sputum. Following out the work of Necki and Lieber, the results of which indicated the value of alkaline solution of tar as a bactericide, Gorianski experimented with solutions containing from 10 to 25 per cent. of tar and 1 per cent. of caustic potash. He also tried crude pyroligneous acid. The acid was found to exert a most vigorous antiseptic action, exposure to its action for six hours being sufficient to destroy all the micro-organisms present, the tubercle bacillus itself being destroyed after one hour's action of the acid. Even a 25 per cent. solution of tar, however, had but a slight effect upon the tubercle bacilli.—Amer. Drug. and Pharm. Rec., 1895, 12, 138.

——— A. Spengler has found that parachlorophenol infallibly kills Koch's bacillus. He injected into the peritoneal cavity of guinea pigs 1 C.cm. of an emulsion of tubercular sputum, prepared either with ordinary water or with a 2 per cent. parachlorophenol solution. On killing the animals some time thereafter those that had been inoculated with disinfected sputum were entirely free from bacillary infection, whereas those into which the emulsion unmixed with parachlorophenol had been injected presented, without exception, tubercular lesions.—Ibid.

Microscopy and Adulterations.

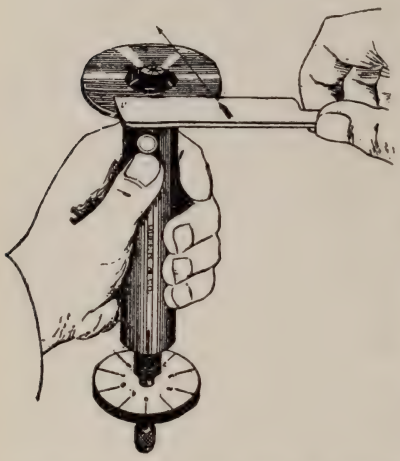
A New Section Instrument for Vegetable Materials.—E. S. Bastin.—It consists of a tube of brass, nickeled, and is long enough to be conveniently held in the hand. At the top of the tube is a circular plate, also nickeled and well polished, so as to form a hard and smooth surface, over which the razor blade is to move, and at the lower end of the tube is a fine-threaded screw, by means of which the object to be sectioned is raised. The large head of the screw is graduated, and there is an index line on the lower end of the tube so that the thickness of the section may be nicely regulated.

There is an interior tube closed at the bottom and open about a third

* See also under Botany, Chemistry, and Materia Medica.

of the way around on one side. This tube nicely fits on the inside of the main tube, and in the side opposite the slit works the clamp-screw, which passes through a slit in the wall of the outer tube. As the micrometer screw at the bottom acts upon the closed end of the inner tube to raise it the clamp-screw slides in the slit in the outer tube. This arrangement enables the stem, or root, or material of whatever sort of which sections are to be made, to be clamped tightly against the wall of the outer tube, and to slide along its smooth surface as the inner tube is raised by the micsometer screw. Since in cutting the object is raised above the sharp edge of the well only the thickness of the section to be cut, there can be no yielding, and thin, even sections of most sorts of material may readily be obtained. With hard tissues, such as woody stems and roots, specially good results are obtained, but its advantages are scarcely less for softer tissues.—Pharm. Era, 1894, 296.

FIG. 59.



A New Section Instrument for Vegetable Materials.

Embedding Medium.—M. C. Brunotte describes a new mode of utilizing gelatin as an embedding medium, by which the action of heat upon tissues containing water can be avoided. Thin sheet gelatin, 20 Gm., is dissolved, by the aid of heat, in 100 Gm. of distilled water. The solution is filtered through fine linen and 30–40 C.c. of glacial acetic acid and 1 Gm. of bichloride of mercury added. This addition keeps the gelatin liquid at the ordinary temperature (15° C.) and of the consistency of a thick syrup. To embed the material, a small quantity of the liquid gelatin is poured into a little mould made of thick absorbent paper, and the object placed on it. The liquid being transparent, the position of the object, by immersion in water, can easily be arranged. The whole is then immersed in alcohol, which hardens the mass of gelatin. In cases in which alcohol might render cloudy the cell contents, picric acid, bichromate of potassium, or chrome alum may be used for hardening the gelatin, but these reagents require a much longer time to act. The sections, as soon as cut, can be mounted in gelatin or glycerin, or can, if required, be quickly freed from the thin coating of gelatin that surrounds them.—Jour. de Botanique ; Nat. Drug., 1895, 80.

Paraffin Embedding for Section Cutting.—Douglas H. Campbell (Botanical Gazette) finds the following method of embedding vegetable tissues

for section-cutting a practical one: A small paper box is made by taking a strip of firm paper and winding it tightly about an ordinary cylindrical cork, fastening the paper with a little gum Arabic and holding it in place with a pin until dry. On taking out the pin the paper cylinder can, of course, be slipped off the cork. The box is completed by cutting out a round piece of paper of exactly the size of the cylinder and putting this into the cylinder as the bottom of the box. The object to be embedded is placed horizontally upon the bottom and melted paraffin poured over it, after which the whole is placed in a shallow, flat-bottomed vessel filled with melted paraffin. Thus there is no possibility of an escape of the paraffin, which otherwise it is almost impossible to prevent, and there is also no necessity of handling the objects after they are once in the paraffin, which, in the case of small objects, is a great advantage. In case the objects are displaced in pouring the paraffin over them, it is a simple matter to adjust them, using a heated needle for this purpose. In order to insure thorough saturation, the objects were usually left over night in the melted paraffin, and then quickly cooled to avoid the formation of bubbles. The vessel containing the paper boxes may be exposed to the air for a few minutes until a thin film has formed over the surface of the paraffin in the latter, when these may be quickly lifted out and plunged into cold water. As soon as the paraffin is thoroughly hard, the pasted seam in the paper cylinder may be loosened with the blade of a knife or scalpel, when it will be found that the paper separates readily from the enclosed paraffin, and on removing the bottom of the box in the same way the result is a solid cylindrical block of paraffin with the object to be cut lying horizontally close to the smooth lower face, so that the sectioning is easily regulated. The author finds paraffin melting at 45° C., as recommended by Schoenland, much too soft to cut well, and prefers, as advocated by Moll, a harder kind melting at about 50° C. He has in no case found a temperature of 50° to 55° C. hurtful to the object. —Drug. Circ., 1895, 131.

The Largest Objective Made.—Schlott's works at Jena are making an objective for an astronomical telescope, which in diameter will be 110 centimetres, or about 43⅓ inches, over 5 inches more than the one at the Lick Observatory. The lens weighs about 2,000 lbs., rough cast, and will cost, when finished, 300,000 marks, or about $75,000.—Pharm. Era, 1894, 491.

New Staining Process.—O. Zacharias recommends the following process for both animal and vegetable preparations. The material is laid in 70 per cent. alcohol, and then for from 15 to 54 hours in acetic-carmine, prepared by boiling 1 Gm. powdered carmine for 20 minutes in 150–200 Gm. dilute acetic acid, and filtering when it has become cold. The preparation is washed in dilute acetic acid, and then placed for from two to three hours in ferric ammonium citrate.—Bot. Centralbl., ix., 1894.

Staining of Cellulose.—E. G. Love has experimented with Grenacher's carmine, and finds that cotton and linen fibres immersed in the same from 12 to 54 hours produced only a slight reddish tint. Borax carmine using oxalic acid as the fixing agent produced the same result. Thierich's carmine produced a dull and faint rose color. Logwood and Brazilwood, using mordants of the acetates of aluminum and copper, gave a uniform purple and blue shade respectively. Satisfactory results were had with the anilin colors in staining cellulose and liquefied fibres. The author finds fuchsin for staining of wool.—Nat. Drug., 1894, 357.

The Weigert-Pal Staining Method.—R. H. Freund.—Formalin has shown itself to be one of the best hardening agents for microscopal purposes and nuclear stains. The drawback to it for general use has been, heretofore, that nervous tissue so hardened could not accept the Weigert stain. Magnus has overcome this difficulty, and has succeeded in staining specimens by employing the following method: After the spinal cord has been in a one-half per cent. solution of formalin for from two to four weeks, small pieces $\frac{1}{2}$ Cm. thick are cut off and placed in a solution of Mueller's fluid in a brood oven kept at 37° C. for a week. After this they are a day in 95 per cent. alcohol, and then for a day in absolute alcohol, and then follows the imbedding in celloidin. After the piece has been cut on the microtome, the sections are placed again in Mueller's fluid, and then put in the brood oven for from a day to a week. The sections are then quickly washed in alcohol and put in the Weigert-Pal hæmatoxylin solution, where they soak for at least two days. The stain which he has thus obtained is very distinct. The myelin sheaths are beautifully blue, and all the degenerated tissue is decolorized. The ganglion cells are very distinct and their nuclei show clearly.—Jour. Nerv. and Ment. Dis., March, 1895; Pac. Drug. Phys., 1895, 20.

Practical Pharmacognosy.—Exercises on systems of tissues with illustrations intended as a preliminary to the study of the structure of medicinal barks.—Pharm. Jour., Trans., 1894, 21, 41.

Application of the Microscope.—A re-print of the first lecture on the application of the microscope in pharmacy and the drug trade that was delivered in the United States on February 12, 1874, by Dr. Hoffman.—Pharm. Era, 1894, 341.

A Microscopic Clearer.—Lenz recommends the use of a solution of sodium salicylate for clearing preparations for the microscope. This body has great advantages over chloral, as it very quickly transforms starch granules into a transparent jelly, which are not disturbed by the addition of glycerin or water, and still turning blue with iodine. Further, it has less detrimental effects on the ordinary tissues than chloral.—Brit. and Col. Drug., 1894, 411.

Cell Culture of Fungi.—In Bessye's Botany the following directions are given for cultivating fungi, the blue mold of bread, for instance, in cells: Glass, tin or india-rubber rings four to 5 Mm. high are fastened to ordinary glass slides; a very little water is placed in the bottom of the cell so formed, to keep the air in it always moist: a small drop of the nutrient liquid, free from spores of any kind, is placed in the middle of a cover glass of the proper dimensions, and in this a single spore of some particular mold is placed; the cover glass is now inverted over the cell. The preparation must be placed in a warm and saturated atmosphere. An ordinary bell-jar set over a plate of water, or, better still, of wet sand, will furnish a very good moist chamber.—West. Drug., 1895, 239.

Nutrient Liquid for the Above.—First, boiled and filtered orange-juice; second, a decoction of fresh horse-dung boiled and filtered; third, a saline solution as follows:

Calcium nitrate	4 Gm.
Potassium phosphate	1 Gm.
Magnesium sulphate	1 Gm.
Potassium nitrate	1 Gm.
Sugar	7 Gm.
Distilled water	700 Gm.

—Ibid.

Relative Volume of Powders.—To determine the relative volume of powdered preparations, take a small round measure of about 2 decimetres in height and 1½ centimetre in diameter, which must be graduated from the bottom upwards in cubic centimetres; put a small amount of powder into the vessel by means of a funnel made of black glazed paper, and tap the measure against a rigid surface until after one to two minutes the volume of the powder does not diminish. Powders which have become aggregated must, of course, be re-powdered; if the number of the observed cubic centimetres is divided by the weight in grams of the powder taken, a number is obtained which Glückmann terms the relative volume. By means of this volumetric method, the approximate nature of certain preparations can be indicated.—Pharm. Centralh., 1895, 279.

Fineness of Vegetable Powders Determined Micrometrically.—E. Dieterich discusses the advisability of fixing micrometrically the degree of fineness of powders entering into ointments. He is now laying the foundation for applying the same principle to vegetable powders, and has made a prliminary report in the Pharmaceutische Centralhalle. In the first place he established the fact that powders passed through the same sieve twice are much more uniform than those sifted but once. In the following table the maximum diameters only are given in micromillimeters. Samples No. ii. to xi. were obtained from various drug-millers, while No. i. represents the powders sifted twice.

Pulveres.	I. 2x	II.	III.	IV.	V.	VI.
	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.
Hyoscyami Hb.....	3.32	3.53	6.30	7.56	5.88	12.60
Digitalis Hb.....	2.94	3.48	6.72	5.04	6.72	16.80
Conii Hb.....	2.10	2.94	—	3.78	7.56	16.80
Belladonnæ Hb.....	2.10	3.23	—	—	—	—
Meliloti Hb.....	3.36	7.23	6.72	6.72	8.40	12.60
Sennæ Tinn.....	3.78	8.43	6.30	6.72	8.40	4.20
Sennæ Alex.....	3.02	7.23	5.88	5.45	8.40	5.60
Altheæ Rd.....	1.26	4.32	1.68	4.20	4.20	5.04
Liquiritiæ Rd.....	2.60	8.24	6.90	6.72	7.40	5.46
Rhei Rd.....	3.36	4.72	3.36	5.88	7.14	12.60

The method employed consisted in placing the powder on a slide, moistening with paraffin oil, and grinding down gently with the cover glass. Since the oil renders the particles more or less translucent, it is best to utilize the diaphragm and illuminate obliquely.—West. Drug., 1894, 218. Compare with Proc., 1894, 633.)

Microscopical Reaction of Calycin.—W. Zopf makes a section of the yellow lichen (Lepra candelaris Schaer?) and places it in the slide under the cover glass and then applies a drop of chloroform and sodium hydrate: a brick-red color will be formed in the cells containing the yellow calycin groups. It is formed in the periphery of the lichen.—Ztschr. wissenschaftl. Mikroskop., 1895, 495; Chem. Zeit., 1895 (Rep.) 106.

Detection of Copper in Green Preserves.—A. Tschirch (Ztsch. f. Anal. Chem., 1894, xxxiv, p. 103) publishes the following method for determining the origin of the green color in certain preserved foods. An alcoholic extract of the fruit or vegetable is evaporated to dryness, the residue washed with water, and treated with concentrated hydrochloric acid. Pure chlorophyll gives a deep blue solution, and a residue soluble in ether with a brown color. When copper phyllocyanate is present, hydrochloric acid yields a yellow substance and a residue soluble in alcohol with a green color. If dilute hydrochloric acid, added to the alcoholic extract, gives a green color, it indicates copper; if yellow, the extract is free from this metal.

Examination of Flour for Mineral Matter.—M. Rondelet proposes the following method for the examination of flour and yeast for mineral matters. A little of the suspected material is placed on a microscope slide and one or two drops of an aqueous solution of anilin and alcoholic fuchsin solution are then added, and followed by an equal quantity of tincture of iodine and distilled water. On applying a cover glass and examining, the cellulose appears reddish-brown and starchy matter black; but any mineral matter present will be yellowish, like the background of the preparation. The addition of a drop of water clears the preparation, crystals

appearing with their normal tint and sharply defined. It is stated that in less than five minutes it is thus possible to decide whether a flour contains plaster, barium sulphate, china clay, etc.—Jour. de Pharm. d'Anvers: Drug. Circ., 1894, 250.

Purity of Drugs, etc.—L. F. Kebler has examined samples of honey which contained an excess of chlorides and were supposed to have been adulterated with glucose, in the preparation of which hydrochloric acid had been used. On inquiry it was found to have been accumulated from "a salt marsh," and a complete examination was made to determine whether the environment might not account for the excessive proportion of chlorides. The result was as follows: Average percentage of water, 16.13; ash, 0.25; reducing sugar, 68.19; pollen grains in abundance; sulphates, a trace; chlorides, excessive. It was considered, therefore, that the samples represented natural products. Three samples of pyrogallic acid examined by the same writer had the following melting point: 116°–118°, 116°, and 117°, respectively. They were probably mixtures of pyrogallic acid (m. p., 131°) and catechol (m. p., 111°). Of four samples of light oil of wine, varying in price from 80 cents to $4.50, one was entirely fusel oil, two were mixtures of ether, alcohol, and small quantities of heavy oil of wine, and the fourth was approximately a mixture of equal parts of commercial ether and heavy oil of wine. Four out of ten samples of oil of sassafras approximately complied with the U. S. P. requirements, one consisted of commercial safrol, and the remaining five of "artificial sassafras oil," produced by fractionating camphor oil. Finally, examination of two samples of ipecacuanha root by Keller's process showed that the thick annulaled or "fancy" root (1.67 per cent. alkaloid found) is frequently not as valuable as the "wiry" root (2.39 per cent. of alkaloid found), whilst titration with volumetric acid solutions gave most encouraging results.—Am. Jour. Pharm., lxvii, 26.

Report of Adulteration Committee of the O. S. P. A.—Messrs. Young and Lislee examined iodoform, boric acid, zinc oxide, and found them fairly pure. Potassii Bitartras complied with U. S. P. requirements: bismuthi subcarbonas contained a trace of chloride and alkali and arsenic. Spiritus ætheris nitrosi contained one per cent, ethyl nitrite. 5 samples of cinchona gave an average of 3.4 total alkaloids. Opium yielded an average of 12.18 per cent. of morphine. 2 samples of tinct. opii were below standard. Extract of nux vomica yielded from 13.6 to 15.6 per cent. alkaloids. One sample of jalap yielded 11.5 per cent. resin, of which 1.5 per cent. was soluble in ether. Aqua ammoniæ was below the U. S. P. requirements. Two-grain quinine pills contained but 1.41 grain of alkaloid. Oleum lini contained paraffin and cotton-seed oil.—Bull. Pharm., 1894, 304.

Food and Drug Adulteration in the United States.—Special Agent Alex-

ander J. Wedderburn, of the Department of Agriculture, has made an exhaustive report, from which the following is extracted:

"The effort to purge the country of this crime is doing good, and aids in keeping down the adulteration of the products we consume. That almost every article of food and drug used in our country is adulterated is proved most conclusively by a vast amount of information gathered by the department. The general character of the food adulterations is principally commercial fraud, and the extent of criminal or poisonous adulteration of food is so limited as to amount to but a bagatelle in the immense sum of products consumed. A large proportion of poisonous adulterations arises from carelessness and ignorance. But ignorance is no excuse for the wholesale destruction of life by the addition of poisonous pigments to many articles of food, and especially to confectionery, cream, and like articles. Whether the intent be criminal and vicious, or simply fraudulent, the result is the same, and the people will continue to suffer until the strong hand of federal law steps in to supplement and support the action of the states.

"The extent of adulteration is fully 15 per cent., of which 2 per cent. is of a character injurious to health. But to furnish 65,000,000 people with food, drink, and drugs, costs not less than $6,760,000,000, and it is found that the amount of adulteration reaches the immense sum of $1,014,000,000 annually. As at least 2 per cent. of the whole is deleterious to health, $136,200,000 constitutes the annual amoant paid by the American people for sacrifice of their lives or injury to their health. As there exists no more serious or exhaustive drain upon the resources of the people than the adulteration of their food and drug products, the federal government should enact a law to prevent the transportation of misbranded, poisonous, or deleterious food and drugs from one State or Territory into another, not interfering with the police powers of the State. This being done, the various State laws would become effective, and by systematic effort on the part of officials or honest dealers and manufacturers, adulterations would be reduced to a minimum and millions of dollars saved annually to the country."—West. Drug., 1895, 53.

Food Adulteration.—The Darmstadt Committee of Control over the adulteration of foods have just made their half-yearly report. Nineteen samples of dried American apples have been examined, and eight found to contain valerianate of zinc. Of 13 samples of spice one was adulterated. A sample of digestive salt was examined and found to be impure sodium bicarbonate; the price was 50 pff. per packet, whilst the value of the alkali was only 5 pff. Seventy samples of milk were examined, of which 41 (59 per cent.) were adulterated. Of these, 13 were skimmed, six both watered and skimmed, and the remainder watered. Of 45 samples of lard, 10 were adulterated.—Apoth. Zeit., 1894; Brit. and Col. Drug., 1894.

Adulteration in Hamburg.—The report from the Government officials

with reference to the adulteration of food for the month of September is just published. 355 samples of milk were analyzed, of which 303 were pure and 52 were adulterated. 59 samples of butter were examined, of which 38 were pure and 21 adulterated, doubtful or spoiled samples. In all, 514 samples were examined, of which 415 were pure, 71 adulterated. 1 doubtful, and 27 distinctly harmful to general health.—Ibid.

Adulteration of Drugs in the U. S.—Albert Plaut says that to-day very little if any adulterated opium is to be found in open market. Spurious cubebs have almost, if not quite, disappeared. False arnica flowers have also gone, owing to the cheapness of the genuine product. Asafetida is of a much higher average grade than a year ago. Ipecac root to-day is freer from admixtures, owing to the efforts of the U. S. Customs Examiner at New York. There is a very general sale of Curaçoa aloes at Barbadoes. The adulteration of insect powder is not quite as prevalent as in former years. Russian cantharides, when sold in the form of powder, are being largely mixed with the Chinese variety. Cotton seed oil is now being adulterated with paraffin oil. There is also the sale of a mineral lubricating oil under the name of "commercial" castor oil, "Kaster oil," etc. The sale of French and Turkish cuttle-fish bone as Trieste is also a matter of notoriety. A species of jaborandi is appearing in commerce and intended to be substituted for the true pilocarpus jaborandi. Verona and Morocco orris root is another instance of deceit; when powdered, it is rather difficult to distinguish them.

In fact, the adulteration of crude drugs in the whole state is fortunately fast becoming more and more troublesome, and manipulators are compelled to devote their attention to drugs in powdered form, where detection is less easy. It is therefore of great importance to the trade that Congress has retained in the new Customs Law the provision imposing an import duty of ten per cent. on powdered and ground drugs.

The best cultivated and most fruitful field for dishonest practice in our branch of trade has always been in the esssential oil business, and it continues to be so. Turpentine and alcohol are the most common adulterants, and the oils of lemon, bergamot and orange, lavender, thyme and rosemary, cedar, spruce and hemlock are the old stand-bys and victims of the manipulator. The adulteration of oil rose with geranium oil and of oil sandalwood with cedar oil are also very common.

The chemicals sold in the United States, both medicinal and technical, are of the very highest standard, and wilful adulteration is of the rarest occurrence. Almost the same unreserved praise can be bestowed on the pharmaceutical and galenical preparations of commerce; as a class they rank high.

A form of deceit which should be discountenanced, the more so as the law cannot reach its beneficiaries, is the sale of mixtures of well-known remedies under assumed and fanciful names, intended to make the pur-

chaser believe that he is getting a new and valuable remedy, whereas he is simply paying a high price for oftentimes an inferior article, which under its true name, and of undoubted quality, he can procure at a small percentage of the price of the advertised product. These remarks are by no means intended to palliate substitution; the use of such commodities can soon be stopped by exposure, both through the trade and scientific press and through personal discourse.

Legislation on Adulteration.—The all-important question whether adulteration can be suppressed or lessened by legislation seems to be answered in the affirmative by experience, especially in some of the European countries. While punitive laws may not change the nature of the men they are meant to affect, they certainly exercise a deterrent effect on their actions, and love of gain is counterbalanced by fear of exposure and punishment. But legislation of this character should be dealt with very cautiously; the liberty of the individual must be respected, and interfered with as little as possible. Trade and commerce cannot thrive if hampered by regulations which, while intended to make things hot for the malefactor, in their execution act as a chain and a burden to the honest merchant; and opportunities for blackmail, both by Government officials and informers, should be reduced to a minimum. Such laws as the infamous Paddock Law would do a thousand times more harm than good. And the vaporings of such men as its principal advocate, Wedderburn, as put forth in a recent report to the Agricultural Department, should be branded at once as false.

How unreliable and misleading figures are in this connection, is shown by an article in the "Chemist and Druggist" on this subject, abstracted below, reviewing the report of the British Local Government Board on the working of the Sale of Food and Drugs Act.

We find it stated that the Bristol analyist analyzed 350 samples and found 23 of them adulterated; the Gloucester official tested 26 samples and condemned 9 of them. The most stolid of Whitehall mathematicians even will hardly assume from these figures that adulteration is five times as prevalent in Gloucester as it is at Bristol, which is what the statistics establish, if they establish anything. It may simply mean that at Gloucester samples were taken with a little more discretion than at Bristol, but as a matter of fact no conclusion of any sort can be drawn from statistics compiled on no fixed basis whatever. And yet the board itself has the audacity year by year to draw up a total summary of all these figures and per cent. averages expressly for the purpose—at least, we can imagine no other—of misleading the simple gentlemen who write editorial articles for the daily papers. * * * * The absurdity of such estimates is disclosed when the constituents of the table are looked at. It appears that morality in the jam-trade rose tremendously in 1892—the percentage of adulteration having dropped from 2.7 to 0.6. In beer on the other hand, it went up from 4.1 to 16.8, and in drugs, from 16.4 to 20.1. Moreover, it must be remembered that the articles said to be adulterated are not those which have proved to have been so; they are only those which the analyst said were impure. Even the innocent board reporter is smart enough to see that his statistics are a little shaky in this respect, for he comments on the drug section as follows: "The ex-

tent of the disproportion between the number of samples of drugs reported against, and those in respect of which proceedings were successfully taken, suggests that the substantial adulteration of drugs may possibly be more rare than the percentage in the table would seem to indicate. Of the 141 samples condemned, only 44 were the subject of prosecutions, and in just half of these cases fines were imposed."*

Our own laws on this important matter are varied; most of the States have statutes, generally with the English laws on the subject as a basis, fully covering the ground. The trouble lies not as much with the law as with its enforcement; this is very lax as a rule, chiefly because sufficient funds are not placed at the disposal of the officers having the law in charge.

But a much more efficient factor in the suppression of adulteration than legislation ever could be, is rapidly making itself felt; Education. Our Colleges of Pharmacy and other similar institutions of learning and our scientific and trade journals, are not only enlarging the knowledge of those engaged in our branch of trade, are not only exposing frauds and humbugs, but at the same time, almost unconsciously, are elevating the character of the individual, quickening his conscience, and developing his ethics. Let us foster them, honor them and help them.—Amer. Drug. and Pharm. Rec., 1894, 296.

Drug Adulterations.—F. Edel says that American calomel is equal to the best English brands. He also has found American bicarbonate of soda to be equal, and in some cases superior to the English brands. He examined a sample of cream of tartar that contained but 36 per cent. of bitartrate of potassium. A sample of powdered cassia contained cocoanut shells. A sample of cloves was deprived of its oil and then reground with a small portion of oil of cloves.—Amer. Drug. and Pharm. Rec., 1895, 43.

MATERIA MEDICA (VEGETABLE) AND BOTANY.

General.

A Diarrhœa Plant.—A fruit of a shrub inhabiting Central Australia, collected by L. G. Browne, who states that the natives employ the plant with good effect in cases of diarrhœa (Kew Bulletin, June, 193).—Pharm. Jour. Trans., 1894, 73.

Some Rare Drugs.—E. Merck (in his "Bericht über das Jahr 1894," p. 112) describes the following rare drugs:

* (See Food and Drug Adulterations in the U. S.)

(1) *Rabalesia Philippinensis* bark, from *Rabalesia Philippinensis Planchon*, a Xanthoxylacea indigenous to the Philippine Islands, where it is popularly known as Lunas, Paetan, Abuhab. Little has been written on this drug. According to Delgado, it is extremely bitter and produces vomiting and griping, even when taken in small doses. The natives employ an infusion of paetan bark as a collyrium in ocular inflammations. Even this instillation causes a bitter taste in the throat and on the tongue. Physiologic experiments on animals, made with the extract of rabelesia, have shown the drug to be extremely poisonous; its active principle has not as yet been isolated.

(2) *Calliandra Houstoni*, a Leguminosa of Mexico, where it is known as Pambotano. According to Valude and Villejan, this drug is a reliable remedy against marsh fever. It is used chiefly in the form of an infusion of the bark obtained by boiling 60–70 Gm. of the cut drug in a liter of water until the liquid is reduced to one-half its volume; and this quantity is taken in the course of twenty-four hours. Usually one such amount suffices to cure the fever; however, should the latter persist, a second dose, taken forty eight hours after the first, will surely have the desired result.

Besides nausea and slight vomiting, no by effects were observed from the pombatano; and these inconveniences may be averted by administering the remedy on an empty stomach.

(3) *Jacaranda Acutifolia*, a Peruvian Bignoniacea known popularly as Arabicheo, Jarabisco and Paravisco. According to Engler and Prantl, the fruit is lauded in Peru as a remedy against syphilis; and from communications to E. Merck it appears that the natives employ an aqueous extract of the fruit, prepared with the aid of heat, as an external application in buboes. The active constituent seems to be a tannin, which gives a green color with iron compounds, and is present both in the fruit and in the leaves, the decoction of the latter being also credited with astringent properties.

(4) *Acocanthera Deflersii*, an East African Apocynacea, where it is known as Erythrea and Jemen. Schweinfurth was the first to cultivate the plant in Europe, and Lewin has studied its anatomy and isolated an amorphous glucoside, Ouabain, whose physiologic action has been reported on by L. Lewin, and, briefly, by E. Merck in his "Bericht" for 1893.

(5) *Anagyris Foetida*, a Mediterranean Leguminosa, known popularly in the French as "Bois Puant." The shrub-like tree emits a disagreeable odor when shaken, which seems to emanate chiefly from the bark. In ancient times, the seeds of anagyris fœtida were employed for emetic purposes. Semmola found in them inulin, a purgative principle, and an acrid oil. Later, Reale isolated a fatty, non-drying oil, two resin-like substances, a glucoside, and an alkaloid, anagyrine.

Arrow Poisons.—L. Lewin.—This is a historical account of the subject of arrow poisons, together with some physiological experiments on animals,

relating to their action; in some cases the source of the poison is given or guessed at; the question of the chemical substances present is hardly gone into, and in no case completely. The account of the different poisons used by various and numerous tribes, shows that they vary considerably.—Virchow's Archiv., 1894, 82; Jour. Chem. Soc., 1894, 361.

Poisonous Plants of South Africa.—J. Medley Wood has recently issued notes on local poisonous plants with the view of making them better known, and so preventing accidental poisoning by them. The following are some of the plants mentioned (Pharm. Journ., 1894, 275):

(1) *Lasiosiphon anthylloides, Meisn.:* The roots are very acrid, like mezereon and other plants of the same order (Thymelaceæ) to which it belongs. It has bright yellow flowers, in terminal clusters, very conspicuous, and sweetly scented in the evening. Unlike the mezereon, it has ten stamens; and there are five scales alternate with the lobes of the perianth. The roots are said to be used by the natives as an antidote for snake bites, but great caution is observed as to the quantity administered.

(2) *Lichtensteinia interrupta, E. M.:* An umbelliferous plant, the root of which is used by the natives as a remedy for colds. A. Smith, (of Lovedale) says it certainly has the power of giving an immediate headache.

(3) *Combretum Bracteosum:* The fruit of this plant is locally known as the "hiccup" nut, and by the natives as "Umtandawa." The plant is a climbing shrub, with ovate leaves and terminal spikes of dull red flowers. The fruit is an oblong nut with a pleasant flavor, but causes violent hiccough if only a few are eaten.

(4) An allied species, *C. erythrophyllum, Sond.*, known as "Umduba," distinguished by its papery four-winged fruits, and its leaves turning almost white before flowering, but reddish in the autumn, is stated by J. Kirkman to be used as a medicine by the natives in the dose of one-half ounce or less, but an over-dose causes death.

(5) *Tephrosia macropoda, E. M.:* This leguminous plant, known to the natives as "Ityozaan," is not uncommon in the colony of Natal. The roots are used for stupefying fish, and for freeing dogs from vermin.

(6) *Phytolacca stricta, Hoffm.:* In the Cape Colony this is known as the "wild sweet potato." A. Smith says that three brothers had been eating a portion of the tubers when out in the field, and were poisoned. They recovered by giving them an emetic, though one of them was in a state of collapse. An allied species, *P. abyssinica*, is used medicinally by the natives.

(7) *Acokanthera venenata, Don.:* All parts of the plant are more or less deleterious. It is known to have formed the chief ingredient used by the Bushmen for their arrow poisons. A Bushman in the employ of Colonel Bowker stated that it is prepared as follows: The bark is pounded between stones, boiled for some time with water, then strained and the water again boiled until a jelly is formed, into which the point of the arrow is dipped.

Andrew Smith says that a little fresh juice of Euphorbia is added after boiling, and that no snake poison or other substance is used. He also says that in the Transvaal the poison is extracted from the fruits, and that it is more abundant in the seed. The plant has also been used by the natives for snake bites and medicinally in other ways, and A. Smith cites two fatal cases which followed its use. Wood believes that *A. spectabilis*, which has larger, white, fragrant flowers, and much larger, oval black fruits, about the size of a cherry, is also poisonous.

(8) *Buphane disticha*, or *B. toxicarra :* This bulbous plant, known to the natives as "Incwadi," has the reputation of being poisonous, and is reputed to have been one of the ingredients used by the Bushmen to poison their arrows. It has also been used as a remedy for "red-water" in cattle.

(9) *Hæmanthus natalensis :* Another bulbous plant, the fruit of which forms a glubose red berry, is also reputed to be poisonous. Hemlock, stramonium, and the physic nuts (*Jatropha curcas* and *J. multifida*) are also enumerated amongst the poisonous plants of the colony.

The Medicinal Plants of Gambia.—A report on these drugs, by J. H. Ozanne, has just been published, and the account of some of them is sufficiently interesting to reproduce :

Anona senegalensis, known by the natives as "Diorgud," is a drug whose leaves are largely employed to prepare an infusion in hot water as a remedy for diarrhœa and stomach-ache. Its flowers are used as an ingredient for food.

Cochlospermum tinctorium, the native "Foosca," provides a decoction which is used to relieve difficult labor. The decoction is prepared from the roots. This plant is also known in the Soudan on account of a dye contained in the roots.

Sclerocarya provides a gum which is mixed with soot, and furnishes an excellent ink. The sap, also, is evaporated to a thick syrupy consistence, and when sweetened is used to make the native "water-gruel."

Cassia sieberiana is a small shrub known as "guamgua." The watery extract of the root is used as a diuretic.

Combretum, a lately-discovered plant known as "Topp." The decoction of the roots is used as a remedy for stomach ache, and the gum or resin contained in the plant is used for tooth-ache.

Sphæranthus hirtus is a common weed known as "Loodkidge." It is strewn on the bed of the patient and relieves the pain by inducing sleep —such at least is the action commonly attributed to it.

Ocimum basilicum comes largely from the west coast of Africa. It is a common weed, used as a blood cooler.—Brit. and Col. Drug., 1894, 27.

The Illustrated Hindu Medicinal Plants.—Purna Chandra Saha's idea in publishing this work seems to have been to produce an illustrated work readable both by Hindus and Europeans, concerning the medicinal plants of India, especially those mentioned in the Ayurveda. He hopes to finish

the work in five parts if it is well received by the public. The first part occupies about forty pages, and ten of these are illustrated with drawings of the plants, which, with one colored drawing as a frontispiece, illustrate forty-one species. The drawings give an excellent idea of the plants represented. Each one is accompanied by a description in English, as well as in Sanscrit, and the synonyms in Sanscrit, Bengali, Hindi, Tamil, and Telligoo are given in their English equivalent sounds. The descriptions of the plants are given in simple language, and there is no lack of clearness in the statements concerning the uses of the different parts of the plants. Thus, under Indian bael it is stated that the unripe fruit is a powerful astringent, and is used in dysentery; whilst the ripe fruit is serviceable in habitual costiveness.—Pharm. Jour. Trans., 1895, 831.

Indian Materia Medica.—George Watt gives the following description of Punjaub drugs:

Rhubarb (*Rheum Emodi*), Chukri.—In the village of Baijnash the traders informed me that they annually exported about 1000 maunds of this root to the plains; that it was a purgative, but particularly as an ingredient in preparations applied to wounds and for ophthalmia. The use of Indian rhubarb as an external remedy does not appear to have been mentioned previously, and a trade of the magnitude indicated is far in excess of the total previously recorded for all India. The figure was given by several independent persons, and was subsequently confirmed at Palampur, Kangra City and other localities. The total exports from Kullu and Kangra must, therefore, be very considerable.

Karu (*Picrorhiza Kurrooa*).—Although considerable confusion exists in the writings of many authors regarding this root, and a series of articles have been designated "Kutki," there is no doubt of the fact that "Karu" is both a popular and valuable drug. It is, in small doses, said to be a bitter stomachic, useful in dyspepsia, in larger doses antiperiodic, while possessing, in addition, a useful purgative action. The plant is very prevalent thoughout the Himalaya, at altitudes of 10,000 to 15,000 feet. Its collection and transportation give employment to many persons. In Kangra alone, during a march of about a week's duration, Watt has seen quite 100 mule-loads of this drug being carried toward the plains.

Gentiana Karrooa.—This is one of the plants confused with, and said to be sold along with, the true "Karu." In Kullu Valley, from Mangalor to Sultanpur, it is very prevalent, growing among the grass. It was in full flower in October; but he could never learn that it was put to any use, and certainly never heard it receive the name of "Karu." There seems, however, no doubt of the fact that this very prevalent and beautiful plant could be supplied in large quantity should a demand arise for it as a substitute for the official gentian.

Actæa spicata.—This might be procured in very large quantities from

the higher ranges of the western Himalaya. Its chief use is as an adulterant for the very expensive drug (said to be imported from Tibet) which is known as "Mumiai" (? Coptis teeta).

Mumiai is sold in all the drug-shops of Kangra. It is imported from Lahaul and Tibet, and finds its way from Kangra all over India. Every one acquainted with Indian life has heard of the periodic panics that appear at hill stations (no one knows how) from reports having got abroad that so many persons are to be captured and made into "Mumiai." So long as this scare lasts it is often extremely difficult to get people to go messages, especially after nightfall. The article shown was not, however, made from human fat, but is of a mineral nature, and is sometimes known as "silajit," being found as an exudation from the soil or crevices in the rocks.

Nahani (*Valeriana Hardwickii*).—This is very largely exported from these hills, and appears to be used in India both as a perfume and as a medicine. According to the drug-sellers of Kangra, it is an antispasmodic. It seems well worthy of careful examination as a substitute for the valerian of the Pharmacopœia. The point of importance regarding it lies in the fact that although most writers on the subject do little more than suggest that it may be used, it was found in every drug-shop as a regular article of trade, and was well known to the collectors, who pointed out the living plant in the jungles as the nahani of their trade.

Banafsha (*Viola serpens*).—This is very largely traded in from the western Himalaya. The interest in it consists in the fact that the true banafsha is doubtless the flowers of V. odorata—a species very much more rarely met with—and it is thus possible the Indian substitute possesses none of the properties of the drug which is so much admired by many Mohamedan physicians.

Atis, or Patis (*Aconitum heterophyllum*).—A valuable drug that forms an extensive article of trade from every town in Kangra and Kullu.

Aconitum Napellus.—The only form of this plant found on the higher ranges was a variety with very pale blue flowers and small conical roots. It is neither collected nor traded in from Kangra, though it is well known to the hill people to be poisonous.

Impatiens Sulcata.—The seeds of this very tall balsam are regularly eaten, and a medicinal oil is also said to be extracted from them, which is regarded as of special merit.

"*Kut*," *the* "*Costus*" *of the Greeks* (*Saussurea Lappa*).—This valuable perfume has not hitherto been regarded as exported from Kullu and Kangra. There is a considerable trade in the root, and Watt collected the plant in one or two of the ranges at an altitude of 8,000 feet.

"*Dhup*" (*Jurinea macrocephala*).—The roots ("Dhup") of this large handsome plant ("Gugul") are extensively collected and exported all

over India as one of the chief ingredients of the incense burnt in temples. That article as prepared on the hills consists of the roots of this plant made up with the wood, leaves and berries of the juniper, a little "Jatámansi," sandalwood and camphor. While examining the ingredients used Watt observed that the trader kept peppercorns with his camphor, and was told that these prevented the evaporation of the camphor. If it be true, the fact should be of great value to museums.

"*Madder*" *or* "*Manjeet*" (*Rubia cordifolia*).—The roots of this most valuable dye-plant appear to be regularly collected all over Kashmir, Kangra, and Kullu. This fact does not seem to be sufficiently well known to the trade, and it is possible that as aniline dyes find their way more completely to the remoter tracts of the Himalaya, like the "al" dye of the Central Provinces, the "Manjeet" of Kangra will disappear from trade.

These are a few of the regular articles seen in the drug-shops of Kangra. Those that follow, belonging rather to the herbalists' stalls, are:

Rhamnus dauricus (*Ségul*).—A common tree throughout the regions from 5,000 to 7,000 feet in altitude. The fruit and juice are regarded as drastic purgatives. If this could be utilized, an indefinite supply exists.

Podophyllum Emodi.—The large scarlet fruits of this plant are universally eaten and relished by the people. They are not purgative, though the roots are recognized as a useful aperient. The number of persons that make a living by collecting and exporting drugs from the higher ranges of Kangra and Kullu is very great. The demand exists for "Karu," "Dhup," "Kut," and many such, and these are regularly exported. If, therefore, the European merchants wish to procure podophyllum, they should find little difficulty in organizing an agency. From the examination of this root, instituted some few years ago, it appears to be remarkably rich in the official resin. India should not only, therefore, meet her own demands, but very largely contribute to the world's supply. [This drug has been proved to be unsatisfactory, and not an adequate substitute for P. peltatum.—Ed. C. & D.]

Balanophora Involucrata.—This most remarkable plant was sold as "Gajpipal." The properties (or supposed properties) could not be discovered.

Among the many medicinal products collected by Watt of which he could not discover the exact sources, since they were not in season during his visit, the two following are interesting:—"Malin," a root sold in Palampur and elsewhere, and said to be very valuable in killing maggots and lice; and "Mallosan," a member of the *Umbelliferæ*, which appears to be a species of *Ligusticum*. One person gave him the name "Bhutkesi" for these roots—a name hitherto assigned to *Corydalis Govaniana*—but it would appear this same mistake has been made on more than the occasion here mentioned. The roots are sold all over Kangra and Kullu for the

purpose of causing the fermentation of "Sur" or beer. The roots of "Mathosan" are made into cakes with barley which are sold as "Dheli," and these are probably identical with the "Paps" of the Tibetans. This subject is of the greatest interest, for in these prepared barley and Mathosan cakes we possess a substance that is said to keep good for a long time, and a small fragment of which may be relied upon to produce fermentation or may be employed in raising bread. To the numerous officers in India who spend many months together in camp these small fermenting-cakes should prove of the greatest service; and it seems just possible that this obscure fermentation agent might even be of value to the brewing industry.—Chem. and Drug., 1895, 76; Brit. and Col. Drug., 1895, 71.

Some Medicinal Products from the Straits Settlements.—E. M. Holmes says that Biah, which was believed to belong to the genus Nauclea, is now considered by him to be *Mitragyna speciosa*. Prual does not belong to either of the Rubaceous genera, Lasianthus or Urophyllum. Stapf will shortly publish an account of his identification of the species. Ipoh Aker is supposed by Holmes to more nearly approach *Strychnos wallichiana*. Poison root, No. 4281, is the root of *Dianella nemorosa Lass* (Libiaceæ). Poko Lulay is nearly allied to *Garcinia merguensis, Wight.* Buah Kumbong sa Mamgkok, the fruit possesses large boat-shaped follicles (which open long before the seed is ripe) attached to the seed. The seed differs from "Bungtalai," in being covered with dense velvety pubescence, and in the inner surface of the follicle being abundantly furnished, and the external sparingly so, with stellate hairs.—Pharm. Jour. Trans., 1895, 1095.

Export Trade of Yezd, Persia.—Of the exports of Yezd the most important is that of opium. It was more largely grown in this province than anything else in comparison with their respective values. Various causes have lately conduced to a decided falling off in the cultivation of the poppy. In a good year the total output of Yezd was some 1200 cases, each case weighing about 130 lbs. An average output would be about 1000 to 1200 cases. In speaking of the opium of Yezd is included not alone that only grown in the province, but also that produced in Khorassan, Tabbas, and even in the Herat district. The crude stuff is sent to Yezd, where it is manufactured. During the past year, viz., 1891–2, the crop has been but a small one. The prices ruling in China and London were low and not remunerative, consequently only about half the usual amount was sown in the Yezd district, and this more for speculative purposes than for anything else. To still further reduce the output, the crop, for want of proper spring rains, was a practical failure. Hence, the maximum quantity of opium manufactured in Yezd was somewhat under 500 cases. One hundred and eighty-two pounds of the crude material in Yezd makes one case of 130 lbs. manufactured article. Of Khorassan's

crude material, 195 lbs. made one case of 130 lbs. A certain portion of the crop is specially manufactured for consumption in the local markets of the country, and is almost entirely supplied by Yezd. It is made into sticks and is used for smoking and eating. Opium smoking is very prevalent in Yezd, and it is said that more is used in this place in that way than in any other town in Persia, with the single exception of Kerman. This habit is gaining ground daily throughout the country. In years past adulteration of the drug was very common, but owing to many and heavy losses by having his cases thrown on his hands, or else being sold at 50 per cent. under current rates, the Persian merchant has in this case learnt wisdom, and has almost entirely discontinued the practice.

Almonds.—These are now mostly exported to Bombay, but in good years, i. e., when the European crop is not an average one, kernels, both sweet and bitter, are exported to England. Last year the export was about 1,040,000 lbs. This year there has been a very large decrease.

Asafœtida.—There used to be an export of some 500,000 lbs. of this gum, about 150,000 lbs. being from Yezd and the balance from Tabbas; but owing to the way it was adulterated the price has greatly fallen, and in consequence the trade has nearly died out. In neither of the last two years has one-tenth of the amount been exported.

Madder Roots.—Adulteration and a consequent declining market has also practically killed the export trade in this article, which used to be fairly large with Bombay. Prices have fallen from 1s. 8d. per 13 pounds to 4d.

Saffron.—Saffron was sent into the Yezd market from Burugird, and thence exported to Bombay. Adulteration has produced the same result as in the previous cases.—Amer. Drug. and Pharm. Rec., 1894; from British Consular Report, 1894.

Preservation of Drugs.—M. Rozsnyai calls attention to the insufficiency of measures taken to prevent the loss of efficiency, if not the complete deterioration of drugs. He dwells in particular upon the deleterious effect of exposing dry extracts to moist air by frequently opening the containers. After referring to the old, efficient, yet neglected, method of using crushed lime, and to the often-recommended and suitable rubber band (pressed upon the glass or tin cover), the author suggests the following simple method for closing vessels perfectly air-tight: Get a tin can 10 Cm. wide, 12 long and 18 high, with carefully soldered sides. A gutter about 1 Cm. in depth and in diameter must be soldered around the opening. The inner and outer edge of this gutter must not be sharp, but bent. The rim of the cover needed for this little box must likewise be bent in about 1 Cm., and so fitted to the middle of the gutter as to stand loosely upon it. Then procure another tin can about 95 Mm. wide, 145 long and 50 high, easily placeable into, and removable from the larger tin. At the head of this

can is to be a plate amply supplied with holes 4 to 5 Mm. wide, and readily and well adjustable to the box. In the middle of this cover fix a small wire hook, which can be turned down upon the cover and serve as a handle. Fill this little box with quick-lime crushed into pieces of the size of peas, and place it upon the bottom of the larger can. Upon the small box place the drug to be kept dry, whether it be a dried plant, extract, or some other hygroscopic body, in a box, a wooden vessel, or a glass covered with paper. This arrangement, according to the author, is even serviceable for plaster, which—like empl. canthar. or cicutæ—are apt to get mouldy, unless kept in dry places; or for flor. verbasci, which possess a beautiful yellow color, but turn black in two or three months if they are not kept absolutely dry. In order to close the tin can air-tight, the gutter running around the opening is filled to two-thirds of its height with some soft cerate (such as cerat. ad. mistac, commun.), the cover pressed into this mass, and the interstice between the cover and the outer side of the gutter smoothly brushed with the finger. The quick-lime enclosed in the little box eagerly absorbs the vapor of the water in the air present. The lime needs to be renewed but once every three months, the apparatus working until then without difficulty, even if it be opened several times a day. —Merck's Mark. Rep., Jan. 15, 1895.

Insects Injuring Drugs.—V. L. Kellogg (Montreal Pharm. Jour., 1894, 252; Oil, Paint and Drug. Rep., 1894) notes the following drug-attacking insects:

Sitrodrepa panicea Linn, attacking blue flag rhizome (Iris versicolor); comfrey root (Symphytum officinale); dogbane root (Apocynum cannabinum; ginger rhizome (Zingiber officinale); marshmallow root (Althæa officinalis): aniseseed (Pimpinella anisum); aconite tuber (Aconitum napellus); musk root (Ferula sumbul); Indian turnip rhizome (Arum triphyllum): belladonna root (Atropa belladonna); witch hazel leaves (Hamamelis virginica); powdered coffee seed (Coffea Arabica); wormwood stems, flower and leaves (Absinthum sp.): thorn-apple leaves (Datura Stramonium); cantharides (Cantharis vesicatoria), and thirty other different drugs.

Lasiorderma serricome Fab., attacking powdered ergot (Claviceps purpurea). Ptinus brunneus Duft., attacking musk root (Ferula sumbul); powdered senna leaves (Cassia acutifolia), and powdered Jaborandi leaves (Pilocarpus pinnatifolius). Silvanus surinamensis Linn, attacking almond meal (Amygdala dulcis).

Silvanus advena Waltl., attacking aconite tuber (Aconitum napellus). Silvanus sq., attacking aconite tuber (Aconitum napellus); ginseng rhizome (Panax quinquefolium); henbane leaves (Hyoscyamus niger); senega root (Polygala). Tenebrio obscurus Fab., attacking parsley root (Apium petroselinum). Paromalos sp., attacking powdered poke root (Phytolacca decandra). Anthrenus varius Fab., attacking powdered cramp bark (Viburnum opulus).

Atropos divinatoria Fab., attacking henbane leaves (Hyoscyamus niger), and golden seal (Hydrastis canadensis); Lepisma saccharina Linn., attacking powdered mezereum bark (Daphne mezereum), and socotrine aloes (Aloe socotrina).

The cosmopolitan and omnivorous little Sitrodrepa panicea was by far the most abundant and widespread in the storerooms. It is really a serious pest of stored drugs. In the case of the cantharides attacked by it, the bodies of the cantharis beetles were completely riddled and broken. Of the thousands of bodies in the canister not one seemed to have been left unattacked. In many other instances the damage done to the drug was considerable.

The remedy, other than preventing the ingress of the insets by using tight jars and canisters, is to expose the infested drug to the vapor of carbon bisulphide. The ease with which this may be done in the case of most drugs gives the druggist a feasible, effective and almost universally applicable remedy.

An Interesting Insecticide.—George Watt has seen in the Sutley Valley the leaves of adhatoda vasica being scattered over a flooded field of rice. He was told these acted as a medicine by killing the insect and fungoid pests of the rice crop. His attention being thus directed to this subject, he conducted many experiments, with the result that the cultivator's opinion of the plant seemed fully justified. The subject was then recommended by the government of India to the attention of the local governments, and much useful additional information was thereby brought to light. Shortly after this Hooper took up the chemical examination of the plant, and succeeded in isolating an alkaloid which he considered the active principle. Bamber, on the other hand, subsequent to Hooper's investigations, reexamined the plant and formed the opinion that the principle which acts as an insecticide appears to be a volatile product. Watt concurs with the opinion of the latter chemist. In all his practical tests he failed to get good results if dried leaves were used. Within the past few months this substance has gained a somewhat remarkable reputation as an insecticide against red spider and mosquito—the two chief pests of the tea plant. But, in addition, the opinion prevails throughout India that this is one of the most valuable plants in the treatment of lung diseases. The suggestion has, therefore, been made that it is possible the insecticide property and its value in these affections may in some way or other be connected. Chem. and Drug., 1895, 76; Brit. and Col. Drug., 1895, 71.

Plant Constituents.

Organic Acids in Plants.—K. Purjewicz shows that the decomposition of organic acids is always taking place in plants, but is especially favored by (1) the influence of light; (2) the influence of a high temperature; (3) continuous exclusion of light at the ordinary temperature. A pro-

duction of organic acids takes place in all plants in the dark when the temperature is not too high (12°–15° C.), but is dependent on the previous formation of carbohydrates in the light, and results from their incomplete oxidation. Further oxidation destroys them, with production of carbon dioxide. The acid formed in the Crassulaceæ is malic; in Pelargonium and Oxalis, oxalic; whilst in Robinia, tartaric and citric acids are found. Malic acid is the most easily decomposed by a strong light and high temperature; next oxalic and tartaric acids; whilst citric acid is the most stable.—Pharm. Jour. Trans., 1894, 173; from Beihefte zum Botanischen Centralblatt, 1894, 368.

Alkaline Reaction During Assimilation in Aquatic Plants.—O. Loew.—According to Hassack, the alkalinity produced by various aquatic plants is due to the hydrogen calcium carbonate in the nutritive solutions, and the production of normal carbonate, due to a separation of alkali by the plant. The author, however, in the case of *Elodea*, observed that not only solutions containing calcium hydrogen carbonate became alkaline, but also those containing calcium nitrate. This was not due to ammonium carbonate, as no ammonia was present. *Elodea* also gradually reddened a solution of phenolphthalein in distilled water, and in eight hours calcium could be detected in the solution; organic matter was also detected. It is concluded that the reddening of phenolphthalein is caused either by some organic calcium compound, or that calcium carbonate is held in solution in a colloïdal state by the separated organic matter, and that this has the power of reddening phenolphthalein. A similar result was, in fact, obtained by shaking a warmed solution of calcium hydrogen carbonate with some gum arabic and phenolphthalein in a capacious flask until the loosely combined carbonic anhydride had separated.—Chem. Centr., 1894, 510; Jour. Chem. Soc., 1894, 425.

Contribution to the Study of Certain Amidic Acids Obtained by Splitting up Proteic Vegetable Substances.—E. Fleurent.—Since we know that vegetable albumen and legumine yield aspartic acid in appreciable proportion, we are entitled to conclude that in the conditions of the experiment this acid, and perhaps its analogues, are split up, producing a quantity of ammonia, which is added to the proportion furnished by the hydration of the carbonic and oxamic groups, and at the same time a corresponding quantity of oxalic acid, and not carbonic acid, breaks the equilibrium established in the case of the animal albuminoids. The transformation of the aspartic and glutamic acids appears as a new fact in the history of the amido-acid compounds. In presence of the facts observed, it is evident that the constitutional formula admitted for aspartic acid cannot explain the mechanism of the splitting up observed.—Compt. rend., Vol. cxix., No. 3.

Alumina in Plants.—Berthelot and Andre (Compt. Rend., cxx., 288),

treating of the presence and distribution of alumina in plants, find that it may exist in the ash of animal plants provided with abundant and deep roots, in a proportion comparable to that of other bases present. The roots of lucerne, dried at 110° C., yielded on analysis 0.5 per cent. of pure alumina; while convolvulus roots yielded 0.4 per cent., and the leaves of the lupin and lime 0.37 and 0.0025 per cent., respectively. The major part of the alumina absorbed is retained by the roots.

Amylase.—M. Effront.—An infusion of barley, made in the cold, and then filtered and boiled, triples, and even quintuples, the diastasic power of malt. The value of two malts is proportioned to the ratio existing between their saccharifying and liquefying powers.—Compt. rend., 1895, No. 23.

Existence in Plants of Principles Capable of being Split up, with Production of Carbonic Acid.—Berthelot and G. Andrè have observed various facts concerning the chemical mechanism of vegetable respiration, as well as the methods employed for the determination. The question concerns the formation of carbonic acid and the absorption of oxygen by the leaves of plants. Their observations have been essentially directed towards the separation of the chemical phenomena, properly so called, from the biological phenomena. They have shown in former memoirs that the leaves of various plants if heated to between 100° and 110° in a current of hydrogen evolve a certain proportion of carbonic acid. This process is independent of biological phenomena. It is equally independent of the presence of oxygen, and proves the existence in the leaves of proximate principles capable of being easily decomposed and developing carbonic acid. If we repeat these experiments in presence of air, that is of oxygen, always between the temperatures of 100° and 110°, we obtain proportions of carbonic acid which may amount to double those found in the absence of oxygen. This fact proves that there exist in the leaves oxidizable principles capable of being affected by air, with an especial formation of carbonic acid. The most recent experiments of the authors turn on the purely chemical formation of carbonic acid in consequence of the scission of immediate principles.—Compt. rend., cxix., No. 18.

Calcium Citrate in Plants.—C. Wehmer.—After calling attention to the very sparing solubility of calcium citrate in water, the author suggests that some of the crystalline deposits in plants (such as the raphides and some sphero-crystals), hitherto supposed to be calcium oxalate, may be citrate. Citric acid has a role in respiration; it is by no means demonstrated that all the carbonic anhydride liberated during respiration is produced from albumen, and it seems more likely that acids containing large amounts of oxygen may undergo complete combustion.—Ann. Agm., 1894, 391; from Ber. deut. bot. Ges., 1893, 333.

Preparation of Chlorophyll.—Schenck extracts the leaves with alcohol,

filters the solution hot, and the crude chlorophyll, which precipitates on cooling, is purified with alcoholic soda solution, filtering and saturating the filtrate with carbonic acid. This precipitate is then extracted with cold alcohol and the resultant solution precipitated by the addition of sodium chloride. The precipitate is dissolved in boiling alcohol and the solution evaporated to dryness and the sodium salt collected. This is washed with water acidified with acetic acid and extracted with ether. The resultant liquid extract is again evaporated, and the amorphous green coloring substance (chlorophyll) free from sodium salt is obtained. It is soluble in aniline, chloroform, benzin, alcohol and ether, and the solution is of a bluish green cast with a red fluorescence.—Pharm. Centralh., 1894, 211.

Chlorophyll.—E. Schunck and L. Marchlewski's experiments concerning the action of hydrochloric acid on an alcoholic solution of chlorophyll appear to proceed as follows: The chlorophyll is first converted into chlorophyllan, and thence into an amorphous substance, phylloxanthin, which is then transformed into fatty acids (?) and a crystalline compound, phyllocyanin. Both phylloxanthin and phyllocyanin form crystalline compounds with copper acetate; that obtained from phyllocyanin gave analytical values indicating the possible empirical formula $C_{68}H_{71}N_5O_{17}Cu_2$. When phyllocyanin is evaporated with hydrochloric acid or treated with alkalies, phyllotaonin is obtained.

Hansen believes that the treatment of chlorophyll with alkalies consists in the removal of the combined fatty acids by hydrolysis, the coloring matter itself remaining intact. He contends that after such treatment the coloring matter is much purer than before. The authors have observed, however, considerable differences in the absorption spectra of chlorophyll solutions before and after treatment with alkalies, which they consider to be incompatible with Hansen's views.—Ann. der. Chem., 1894, 329.

Presence of Several Distinct Chlorophylls in one and the Same Vegetable Species.—A. Etard.—From the total chlorophyllic substance, whether extracted by means of alcohol or of carbon disulphide, the author has separated and analyzed four distinct chlorophylls perfectly definite. They will be described separately.—Compt. rend., vol. cxix, 289.

The Separation of Oxygen by Cells Containing Chromophyll.—T. W. Engelmann.—In these researches the bacterial method was employed, and the results, which are illustrated by colored figures, were as follows: Green plant cells give off oxygen in the light, the amount within wide limits varying with the illumination. The bacteria used need free oxygen for their movements, and within wide limits the amount of movement varies with the amount of oxygen. In cells with chromophyll granules, this test shows that the granules are the source of the oxygen; colorless protoplasm, cell membrane and nucleus are not. Red light, which is the

most absorbed by chlorophyll, leads to the greatest development of oxygen. The green pigment is not itself capable of so acting; it must be present in connection with the living strome of the chlorophyll granule. Other chromophylls act similarly.—Pflüger's Archiv., 1894, 375; Jour. Chem. Soc., 1895, 26.

Physiological Meaning of the Cyanic Coloring Matters.—L. Kny.—According to Kerner, the object of the cyanic coloring matters is to protect the chlorophyll in young organs by shading from the light, or, on the under side of the leaves, to convert light rays into heat rays. In stems and leaf veins, Pick and Kerner connect their presence as screens with the movement and decomposition of plastic substances.—Bied. Centr., 1894, 546; from Naturw. Rundsch., 1893, 620.

Catalonian Cork.—H. W. Bowen (Amer. Drug. and Pharm. Rec., 1895, 47). The exports of cork to the United States in 1891, 1892 and 1893 amounted to $273,395, $189,139, and $171,012, respectively. The next heaviest purchasers are the Argentine Republic, England, Italy, France and the Spanish colonies. So fully do the various grades of this cork meet with the requirements of the local trade, that less than $2,000 worth of cork is imported from other countries.

The forests are almost all situated in the mountains of the province of Gerona, which is contiguous to France and which is one of the four provinces comprising the principality of Catalonia. Some of the forests are small, but others cover many acres of land. Most of them are natural and these are the heartiest and most productive. The planted forests never yield satisfactory results.

In the natural forests there exist trees of 300 and even 400 years of age. When the tree is 25 to 30 years old the bark can be taken off, and thereafter every 12 or 14 years, according to the vigor of the tree. The average yield is about 45 pounds, and the time selected is generally the month of July.

The manufacturing is done almost exclusively in the neighboring towns. The bark is divided into three qualities, according to its condition. The only instrument used in stripping a tree is the axe. Cars are used in transporting it to the towns, and mules and oxen are also employed for that purpose. The wages of cork men are about 85 cents per day, which is rather more than the average workman receives in this part of Spain. In order to protect the forests, and, incidentally, to increase the nation's revenues, an export duty of 85 cents per 100 kgm. is levied on all grades of cork.

The other provinces of Spain in which there are cork forests are Estremadura, Andalusia and Valencia, but there are no exportations of the article from Valencia, nor are there any great quantities exported from the other two provinces named.

The greater part of the bark obtained in this district is made into corks

for bottles, but it is used also for many other purposes—for instance, the rougher kinds of bark make fine decorations for gardens, bridges, gateways and rustic seats, and it is also commonly used as floaters for the lines and nets of fishermen. In its manufactured state it is employed as handles for bicycles, being light and never cold to the touch. Smoker's mouthpieces are also made of it, and penholders, small lamps, shoe soles and even visiting cards. Floors constructed of pieces cut 5 Cm. thick defy hard usage, and so add much to the comfort of home life. What odd bits and ends are left over after the cork has passed through the hands of the more skilled workmen are thriftily collected, ground into powder, and ultimately converted into bricks for building purposes, if it is not good enough to be used for packing fruit.

Cork Industry in Spain.—The Spanish cork industry has now reached as high a point as it ever has been at, and it is one of the most staple sources of national welfare. Upwards of one and a half million acres are devoted to plantations for cork. The province of Gerona, which devotes 400,000 acres to cork plantations, is the headquarters of the industry. It is 100 years since the first factory was founded in this province. The various factories in the villages turn out annually 1,400 million bottle-corks, worth 17 million pestas (about £500,000). Twelve hundred people are kept regularly employed. The chief markets for their goods are London, Paris, Rheims, Epernay, Mainz, Dresden, New York, Calcutta, Melbourne, Sydney and Yeddo.—Ibid.

Proteolytic Ferments in Seedlings.—R. Neumeister.—In the present experiments, advantage was taken of the circumstance that fibrin possesses the power of absorbing ferments from their solutions. Aqueous extracts of the seedlings were made; these were acid, and fresh fibrin was soaked in them; the fibrin was then removed, and placed in acid and alkaline mixtures, and the results observed, control experiments with acid and alkali alone being also performed. Certain seedlings (barley, poppy, maize, wheat, rape) contain ferment which dissolves proteids. It is not formed in the earliest stages, but increases as the plant grows, and is very abundant when the latter has reached the height of 15–20 centimeters. This ferment works, like pepsin, only in acid liquids, but hydrochloric acid destroys it; a vegetable acid like oxalic acid is necessary. It was not found in lupins, vetches, peas, rye or oats.—Zeit. Biol., 1894, 477; Jour. Chem. Soc., 1894, 290.

Diastatic Ferment in Plants.—From experiments on seedlings of *Canna*, *Platanus*, *Phaseolus*, *Begonia*, etc., J. Grüss concludes the existence in seedlings of a soluble diastase which is capable of diffusion through the cell wall in the same way as sugar. It appears to pass with maltose out of the cotyledons into the stem; for the removal of the cotyledons diminishes the amount of diastase in the stem. The quantity of diastase present

was ascertained by its action on starch, the iodine test being used to determine the extent to which the starch had been destroyed. The penetration of the diastase into the substance acted on is accompanied by a simultaneous change in the latter, and to this process the author applies the term "allenolysis." The action of the diastase on the reserve cellulose in the seed of the date is very slow, and ends in its transformation into soluble products, probably mannose. It is by this action of diastase that the absorption of reserve cellulose takes place in the germinating date.—Pringsheims' Jahrbuch für wissensch. Bot., 1894, pp. 379–437.

Galls of Middle Europe.—F. Koch examined material gathered in spring, being the galls upon Quercus pubescens and Q. sessilis, and finds them to contain the following principles in per cent.: H_2O, 85.71; crude fibre, 11.39; nitrogen, 0.2121. The dry material gave 1.3839 per cent. of ash containing SiO_2, 17.79; P_2O_5, 32.38; CaO, 5.17; SO_3, 24.82; K_2O, 15.65; also sugar, 51.81 per cent.; tannic acid, 15.86 per cent. There is an evident relationship between the sugar and tannin in the specimens of galls as gathered when unripe and ripe. Gallocerin, soluble in hot alcohol, ether, aceton, benzol, chloroform and acetic acid (glacial). M. P. 173°; Formula, $C_{19}H_{34}O_2$. The author has acted upon this substance with a number of reagents.—Arch. der Pharm., 1895, 48.

Glutamine in the Green Parts of Plants.—E. Schulze.—It has been previously shown that in the families Caryophyllaceæ and Filices, no asparagine is found. It was therefore expected that glutamine occurred instead. The correctness of this hypothesis is shown by the experiments recorded in the present paper; further experiments show that glutamine is formed in the leaves.—Zeit. f. Physiol. Chem., 1894, 327.

Grafting of Herbaceous Plants.—As the result of a series of experiments, chiefly on Cruciferæ and Leguminosæ, L. Daniel states that graft-hybrids may be produced in herbaceous plants; and that these can be endowed with new alimentary powers by grafting them on varieties which excel them in this respect, and sowing the seeds produced on the graft. Different plants differ greatly in their power of acquiring new characters. It appears to be especially strongly marked in the Cruciferæ. With etiolated herbaceous plants all attempts at grafting were unsuccessful (Bonnier's Rev. Gen. de Botanique, 1894, p. 356). H. Vochting, on the other hand, while he succeeded in grafting Helianthus tuberosus on H. annuus, states that no graft hybridization takes place. Each species preserved fully its own characters; there was no tendency to the formation of tubers on H. annuus; nor did this latter produce inulin (Sitzber. d. k. Preuss. Akad. Wiss. Berlin, 1894, p. 705, through Pharm. Jour.)

Existence of Hydrogen Peroxide in Green Plants.—A. Bach.—None of the usual reagents for hydrogen peroxide can give certain or unquestionable results as to the existence of this substance in plants. We have as little reason to assert it as to deny it.—Compt. Rend., Vol. cxix., 286.

Ice Crystals on Plants.—J. C. Bay deals with the formation of ice crystals on the surface of plants, under certain conditions of weather and surroundings, and states that the conditions of the phenomenon are that the temperature in the soil surrounding the roots of the plant must be above zero, as also must be that of the central parts of the water-conducting tissues, and that the soil must be sufficiently charged with water. The cold causes a contraction of the tissues, and diminishes turgescence and the permeability of the cell-walls to water. As the contents of the peripheral ends of the medullary rays freeze, expand, and are pressed forward, the stem splits at the point of least resistance, and the ice forms a layer covering the whole surface of the wound, the internal pressure supplying water which is drawn up by capillary forces. In many plants, however, splitting of the stem does not occur, and further investigation and explanation is required in such cases.—Bot. Gaz., xix., 321).

Estimation of Lecithin in Plants.—B. V. Bitto.—If any vegetable tissue is extracted first with ether, and then twice with alcohol, each extraction lasting an hour, only a part of the lecithin goes into solution. It is necessary, after extraction with ether, to extract with boiling ethylic alcohol 30, or with methylic alcohol 20 times at least. Each extraction should last 8–10 minutes, never longer than a quarter of an hour.—Zeit. f. physiol. Chem, 1894, 488.

Influence of Different Rays of Light on Plants.—E. Wollny finds that yellow light has the greatest power of producing organic substances in plants; next the red; while blue light has a remarkably prejudicial effect on the development of the reproductive organs. It is, therefore, the most refrangible (chemical) rays which take the least part in metabolism, the assimilation of carbon being carried on mainly by the less refrangible (illuminating) rays (Wollny's "Forschungen," 1894, p. 217). As the result of another series of experiments, M. Villon states that the vine produces a greater weight of grapes, which also contain a larger quantity of alcohol and of acid, when grown behind glass colored red-violet by manganese, which absorbs the yellow and brown rays. Flowers are also favorably influenced by the same color, which is, moreover, advantageous to the growth of bacteria, yeast and silk-worms.—(Revue Scientifique, 1894, p. 460.)

Assimilable Nitrogen.—Pagnoul concludes as the result of an extended investigation that heavy rains may carry off from rich lands a considerable amount of nitric nitrogen, but the plants growing on the soil may prevent this loss. Carbon disulphide is found to check the action of the nitric ferment temporarily, besides causing a temporary suspension in the chemical action during the transition stage in which organic nitrogen passes through the ammoniacal form into the nitric form. The nitrous form is also supposed to be an unstable transition state.—Comp. rend., cxx., 812, through Pharm. Jour. Trans.

Nutrition of Green Plants by Glycerin.—Experiments are described by E. Assfahl that seem to indicate the possibility of glycerin affording nutrition to plants under certain conditions. Filaments of Spirogyra, previously deprived of starch by being kept from the light for a prolonged period, on being immersed in a solution of glycerin produced fresh starch in two hours and a half. This change, however, was only effected in the presence of light. The strength of the glycerin solution employed (0.2 per cent.) enabled the experiments to be continued for a prolonged period. A stronger solution (0.5 per cent.) was used with advantage for experiments of brief duration, but the presence of more than 1 per cent. of glycerin was found to cause ill effects, while, if the proportion was below 0.001 per cent. no appreciable alimentary effect was produced.—Ann. agron., and Jour. Pharm. Chem., 1894, 588.

Apparatus for the Plethysmographic Study of Odors.—This apparatus of T. E. Shields is described as follows in Amer. Drug. and Pharm. Rec., 1894 :

1. It consists of a device for holding the arm firmly in place in the Plethysmograph. Two hard rubber clasps, one fitting the wrist, and the other the arm above the elbow, are rigidly connected by two metal rods. The latter of the clasps fits against the Plethysmograph under the rubber membrane, where it is held in place by two other rigidly connected clasps, one against it outside the rubber membrane, and the other against the flange of the Plethysmograph.

2. A device for separating the pulse and vaso-motor curves. A short wide tube leads from the Plethysmograph to a vertical glass cylinder in which the water level can be made to register the pressure on the arm. Over the water is an air cushon connected with the tambour by a small tube through a piston movable in the cylinder. The motion of the piston controls the size and pressure of the air cushion. The lever of the tambour is made to move the point of an independently supported pen. A long narrow tube leading from the Plethysmograph dips into a test tube of water swung from a delicate spiral spring, (Method described by H. B. Bowditch.) A vertical thread from the bottom of the test tube passes under a pulley, thence horizontally over a second pulley, and is held taut by a small weight. On its horizontal part is fastened a thin aluminum plate capable of holding a glass pen at right angles to the thread. The bulb of the pen is independently suspended by a vertical thread. The pendular motion due to the latter in the direction of the horizontal thread is so adjusted as to neutralize the curvilinear motion of the pen arising from the sag in the horizontal thread. The point of the pen may thus be made to describe a straight horizontal line. The resistance to the motion of the water in the narrow tube is sufficient to destroy all but vaso-motor effects ; pulse effects are, in consequence, only felt through the wide tube.

The odors are contained in a series of bottles. The turning of a stop-cock, which sends the constant current of air through any particular odor bottle, at the same time, by an electrical arrangement, marks the instant and opens the terminal end of the corresponding tube near the subject's nose.

A pneumograph records the respiration. The pulse, vaso motor and respiratory curves, the signal and time records (in seconds) are all traced in ink on a horizontal kymograph.

Absorption of Organic Matter by Plants.—Calderon contests the ordinary view that the nitrogen of the tissues of plants is derived entirely from the nitrates and the ammoniacal salts absorbed through the roots. He does not, however, adopt the old theory that the source is the free nitrogen of the atmosphere, but rather the nitrogenous organic matter which is always floating in the air. The nitrogen of plants he divides into three classes:—*Necrophagus*, the absorption of dead organic matter in various stages of decomposition; *plasmophagus*, the assimilation of living organic matter without elimination or distinction of any kind, between useful and useless substances, such as the nutrition of parasites; and *biophagus*, the absorption of living organisms, such as that known in the case of insectivorous plants. A further illustration of the latter kind of nutrition is, according to Calderon, furnished by all plants provided with viscid hairs or a glutinous excretion, the object of which is the detention and destruction of small insects. To prove the importance of the nitrogenous substances floating in the air to the life of plants, he deprived air of all organic matter in the mode described by Tyndall, and subjected lichens to the access only of this filtered air and distilled water, when he found all these physiological functions to be suddenly suspended.—Nature; Brit. and Col. Drug., 1895, 61.

Researches on Pectase, and on the Pectic Fermentation.—G. Bertrand and A. Mallèvre conclude that pectase exists in solution, as well in the cellular juice of acid fruits as in that of the roots of carrots. There is no insoluble pectase.—Bull. Soc. Chim., 1895, No. 5.

Properties and Reactions of Pectous Substances.—L. Mangin.—Pectous substances are divided into: (1) Pectose, which occurs with cellulose, and is insoluble in water and in copper ammonium hydroxide, but is dissolved by alkalies. (2) Pectin, which readily gelatinizes in water, and is not precipitated by lead acetate. (3) Parapectin, obtained by prolonged boiling from pectin; it is precipitated by lead acetate. (4) Metapectin, produced by boiling parapectin with dilute acids; it is precipitated by barium chloride. (5) Pectic acid, insoluble in water, alcohol and acids; the alkaline salts are soluble, but not those of the alkaline earths. The acid is also soluble in alkaline carbonates and phosphates, and in the ammonium salts of organic acids, forming, it is supposed, double salts. When the acid is boiled with alkalies, metapectin (? metapectic acid) is

formed. This is quite insoluble in water, and forms double salts with all bases, including calcium and barium. The metapectates become yellow in presence of an excess of alkali. Metapectic acid is converted by sulphuric acid into arabinose and another substance not further examined. Pectous substances yield mucic acid when heated with dilute nitric acid. They are not colored blue or violet by iodine. They occur in all plants, except some fungi, and in all membranes except those which have become woody.—Bied. Centr., 1894, 547 = 548 ; Jour. de Bot., 1892, 206, 235, 363.

Pentosans in Plants.—G. de Chalmot has made a number of determinations of pentosans in parts of plants of different ages and developments. The determinations were made by a slight modification of the method described by Flint and Tollens, the mixed pentosans being estimated as equivalent to twice the furfur aldehyde found.—Amer. Chem. Jour., 1894, 218.

Pentosans in Soils.—G. de Chalmot has estimated the pentosans in three soils.—Amer. Chem. Jour., 1894, 229.

Diffusion of Perfumes.—J. Passy considers that the fixation of perfumes by solid bodies, when diffused in an inclosed space, must be due to a process of solution similar to that by which dyes are fixed in tissues. He argues that, in the same way that crystallized fuchsine is greenish with a metallic lustre, and only manifests its characteristic color when in solution, so cumarin in the crystalline state does not present its characteristic odor. Presumably, therefore, tissues perfumed by cumarin contain it, as it were, in solution.—Comp. rend., cxx., 513, through Pharm. Jour. and Trans.

The Production of Perfume in Flowers.—E. Mesnard has been making experiments in this direction, from which he has found that the oil generally occurs in the epidermal cells of the upper surfaces of the petals or sepals, but may occur on both surfaces, especially if the floral parts are completely hidden in the bud. In every case the oil seems to have its origin in the chlorophyll. This is quite comprehensible, if it be admitted, as is generally done, that the floral parts are only leaves which have been modified to fulfil new functions. The perfume of a flower is not noticeable until the essential oil has sufficiently freed itself from the intermediate products from which it is formed, and its occurrence is in some way inversely proportional to the production of tannin and of pigments in the flower.—Brit. and Col. Drug., 1894, 506.

Phosphorus in Vegetable Tissues.—According to G. Pollacci, phosphorus is universally present in vegetable tissues, and is indispensable for certain vital processes. It is absent from the cell wall, but present in appreciable quantities in the protoplasm, and especially in the chromatin granules of the nucleus. It occurs also in the hyphæ and spores of fungi. In the vegetative organs of the higher plants it was found accumulated especially in the meristem and in the conducting tissues. The parts of the flower

most rich in phosphorus are the ovules and the pollen-grains; the nucleus of the reproductive cells contains a much larger quantity than that of the vegetative cells. In seeds it is stored up, especially in the embryo.—Malpighia, 1894, pp. 361–379.

Respiration of Leaves.—L. Maquenne has endeavored to throw fresh light on this subject by comparing the respiration of different kinds of leaves, both in the normal state and after previously remaining for some hours in a vacuum. He wished to ascertain whether the evolution of carbon dioxide by plants is due, as in fermentation, to the splitting up of some compound previously oxidized; or if it is the result of the combustion, pure and simple, of some principle continuously elaborated by the plant, that oxidizes on exposure to air. The author favored the second of these hypotheses, according to which the living cell constantly secretes a combustible substance, which by simple exposure to air oxidizes and gives off carbon dioxide. By checking the action of the oxygen this product would accumulate, so that, on the plant being again brought in contact with the air, respiration would be increased accordingly. To avoid the introduction of error due to the differences in the specimens experimented with, the leaves compared were, in each case, taken from the same plant, besides being of the same weight and as nearly as possible of the same age. As a result of the experiments it was found that, in all cases where the plant was able to resist the effects of the vacuum without undergoing appreciable alteration, it afterwards disengaged a much larger quantity of carbon dioxide than it would have done had it simply been left exposed to the air. Figures based on actual experiments with a number of leaves appear to go far towards proving the truth of the hypothesis.—Compt. rend., cxix., 100.

Grass Tree Resins.—J. H. Maiden contributes some interesting information concerning the so-called "gums" or resins of the grass trees. The two principal kinds that find their way to Europe are the yellow, or "acaroides," and the dark red, or "black boy" gum. These names have a curious history. The former was used in English trade at the end of the last century, but seems never to have been used in Australia, and its origin appears to be unknown. The black boy gum derives its name from the fact that the Xanthorrhoeas, or grass trees, are called "black boys" in Australia, for the reason that a native boy with a tuft of grass on his head and holding a spear resembles in outline one of these plants when in flower, the inflorescence being erect, rigid and rod-like. The acaroides resin is derived from *Xanthorrhoea hastilis*. A tolerably clean specimen selected by Maiden yielded 94.6 per cent. of a yellow resin to alcohol, and the solution on evaporation deposited benzoic acid in feathery crystals. Petroleum spirit extracted 1 per cent. of a fragrant body, apparently containing no benzoic acid. The black boy resin obtained from *Xanthorrhoea arborea* yielded 94.6 per cent. of a deep, orange-brown resin to alcohol,

and to petroleum spirit 3 per cent. of a yellowish resin, destitute of odor. During evaporation of the alcoholic solution a few crystals of benzoic acid separated out. It is also soluble in Eucalyptus oils, except that of *E. amygdalina*. Another species, *Xanthorrhoea tateana*, yields a ruby-red resin, which is of an orange-chrome color when powdered, of which only 1 per cent. of an odorless resin is dissolved by petroleum spirit. The quantity of benzoic acid present in it is intermediate in quantity between that of *X. australis* and *X. hastilis*. The two resins first named are used by Chinese polishers and by some Europeans as a substitute for shellac in French polishing, but it does not answer well, for the work done is sticky at first, and afterwards becomes very brittle and peels off like blistered paint, and the wood is apt to darken and show a play of colors. Moreover, water leaves white marks if splashed on the grass tree gum polish. It is, however, very useful for making sealing wax and for coloring lacquer yellow or red. The method of collecting the resin is thus described: The stems of the grass tree are chopped down, broken into convenient pieces and thrown on a stout canvass sheet. A flail or stout stick is used to disintegrate the pieces, and the resin, which is mixed with the leaf bases, etc., is separated by a sieve. It is then sometimes winnowed in a slight breeze. An average grass tree of *Xanthorrhoea Preissii* was found to yield about 45 lbs. of resin, and three stumps of *X. tateana* afforded four bushels of resin.—Drug. Circ., 1895, 83; from Pharm. Jour. Trans.

Crystalline Nitrogenous Compounds in Seedlings.—E. Schulze reviews previous work. Different seedlings yield to analytical processes different nitrogenous crystalline products. Thus in Lupinus luteus, asparagine, phenylalanine, amidovaleric acid, arginine, choline and xanthine-like substances are found; in Cucurbita pepo, glutamine, asparagine, leucine, tyrosine, arginine, choline, vermine, and xanthine-like substances; in Vicia sativa, asparagine, phenylalanine, leucine, amidovaleric acid, guanidine, choline, and betaine. This does not indicate that in plant metabolism the proteid molecule breaks down in different ways, it being contended that the disintegrative metabolism of proteid is qualitatively the same, but varies quantitatively. This is supported by experiments on plants of the same kind, only of different ages. It may also be that in some plants certain varieties of nitrogenous crystalline compounds are used more in nourishing the tissues, whilst in other plants other compounds are more advantageous, and so are used up first.—Zeit. f. physiol. Chem., 1894, 306.

Presence of Saponins in Plants and Their Determinations—T. F. Hanausek.—Authorities are not agreed as to the poisonous properties of corncockle seeds (Agrostemma gethago). Recently C. Kornauth and A. Arche have proved that pigs may be fattened on these seeds, which have for them the same nutritive value as barley. Other observers consider the seeds injurious, and maintain that where no harm occurs, it is because the saponins are in a great part decomposed by the digestive juices. The

most important saponins, those characterized by Kobert, may be sought by the following microchemical reactions: Rasoll employed concentrated sulphuric acid. The root of saponaria and the bark of quillaja, when treated with this reagent, show the contents of certain parenchyma tissue to be colored yellow, red and violet successively, but this reaction is also observed by concurrent action of the sulphuric acid on albumin, sugar, piperin, etc. A better plan is to use a mixture of equal parts sulphuric acid and alcohol. Sometimes heat is necessary to produce the three colorations; a solution of ferric chloride thus produces a brown or blue-brown precipitate. The richer the drug in saprotoxins, the more does the blue color predominate. This method has been tried with success on corn-cockle seed, Dianthus seeds, fruits of Sapindus, Saponaria and Esculentus, roots of Saponaria, Senega, Polygala major and amara and bark of Quillaja. In Polygala root the saponins are contained in the sub-peridermic cellular layers. In seeds of Agrostemma and Dianthus, the embryo alone contains saponins.—Chem. Zeit., 1894, 71; Jour. Chem. Soc., 1894, 290.

Secretion Ducts.—W. Sieck contributes the results of work undertaken with the object of throwing some light upon the formation of the so-called "schizolysigenous" secretion ducts, especially in rutaceæ and dipterocarpeæ. In rutaceæ he finds a single cell divides, and the young cells thus produced separate schizogenously. The secretion (oil) is formed in the cell-wall bordering the cavity, and by its pressure bursts the thin mucilaginous membrane which retains it in the wall; it is then discharged into the cavity. The inner membrane, unable to withstand the extra pressure put upon it, also bursts, and the cavity thus increases lysigenously. Simultaneously, the middle lamella is converted into mucilage, and the cell breaks up. In anacardium occidentalis numerous cells which had become isolated in this manner were found free in the resinous secretion.—Archiv. de Pharm., 1895, 307.

Secretions and Their Formations.—A. Tschirch (Pharm. Post, 1894, 485, and Pharm. Centralh., 1894, 606) calls attention to the fact that in all the resins so far examined save in *Opoponax* there was a certain general resemblance, since they all consist of esters of aromatic acids together with a peculiar group of alcohols which Tschirch calls resinols. These latter may be divided into two groups, one of which consists of resinols in the narrower sense of the word and the other of resino-tannols, that is such as resemble tannin. Leaving out of consideration for the moment the colorless, crystallizable resinols, the benzo-resinol and the chironol (from opoponax), we find a peculiar relation on the one hand between the aromatic acids which form the resin esters (resins) and on the other, between the ester-forming resino-tannols. The following resin-ester-forming aromatic acids have so far been identified:

Benzoic acid = C_6H_5COOH (In tolu and Peru balsams and in Siam benzoin).

Salicylic acid = $C_6H_4OH(1)COOH(2)$ (In ammoniac).

Cinnamic acid = $C_6H_5CH=CH.COOH$ (In tolu and Peru balsams, Sumatra benzoin and storax).

Paracumarinic acid = $C_6H_4OH(1)CH=CH.COOH(4)$ (In acaroid).

Umbelliferon = $C_6H_3OH.OCO.CH.CH.$ (in galbanum and sagapneum). This last is really more of an alcohol than an acid, but it is very readily converted into dioxycinnamic acid, which in turn is converted into umbelliferic acid.

The resino-tannols so far investigated are:

Sia resino-tannols: $C_{12}H_{14}O_3$ (in Siam benzoin).

Suma resino-tannol, $C_{18}H_{20}O_4$ (in Sumatra benzoin).

Sto-resinol, $C_{12}H_{19}O$ (in storax).

Galba-resino tannol, $C_6H_{10}O$ (in galbanum).

Peru-resino-tannol, $C_{18}H_{20}O_5$ (in Peru balsam) and

Tolu-resino-tannol, $C_{17}H_{18}O_3$ (in Tolu balsam).

On studying these formulas a singular uniformity will be noted. Excepting the tolu-resino-tannol, it will be observed that in the molecule 6 atoms of carbo-hydrogen occur repeatedly. Tolu-resino-tannol and Peru-resino-tannol are, however, members of a homologous series, $(+CH_2)$. Where the resino-tannols belong according to their constitution is not yet clear. The constitution of the coniferous resins is not yet entirely understood. Only this much is determined; that in them not only fatty acids, but also resin acids, of the abietinic acid series which form esters, can occur.

Starch in Plants.—The generally accepted explanation that, in the plant, the transformation of starch into dextrin and sugar is effected under the influence of a diastasic ferment, having been questioned in recent years by several physiolygists, A. Prunet has conducted a series of experiments with potato tubers in the hope of throwing some light upon the subject. The plan adopted was to make comparative determinations of the quantities of dextrin and sugar on the one hand, and of diastase on the other, found in the anterior and posterior halves respectively of tubers in different stages of germination. The former were considered as glucose and determined by Soxhlet's method, and the amount of diastase was indicated by the process of Wortman. As an outcome of the research, it is shown that in potato tubers there does exist a relation between the distribution of diastase and that of the dextrins and sugars; and consequently between that of diastase and the conversion of starch. The results, therefore, tend to confirm the general opinion that the digestion of nutritive matters is effected, not by the direct action of protoplasm, but by means of diastasic substances produced as results of its activity.—West. Drug., 1894, 372.

Occurrence of Trigonelline in Peas and Hemp-seed.—E. Schulze and S. Frankfurt.—The undetermined base found in peas has now been identified

with the trigonelline obtained by Jahns from trigonella seed, and shown by him to be identical with Hantzsh's synthetically prepared methylbetaine of nicotinic acid. It occurs in small quantities only, both in green and dried peas (Pisum sativum) and in the seeds of hemp (Cannabis sativa). Ber. d. Chem. Ges., 1894, 769.

Ocotilla Wax.—Schär obtained 9 per cent. of wax by means of petroleum ether from the rind of Fouquiera splendens, Engelm. This wax resembles palm-wax. It yields cerotic acid and melissyl alcohol.—Pharm. Centralh., 1894, 598.

Natural Orders.

ACANTHACEÆ.

Adhatodo Vasica, Nees (Adhatoda). A dense shrub, sometimes arborescent; leaves elliptical, acute at both ends, entire, minutely pubescent; spike dense, short; corolla white; capsule, clavate, pubescent, four seeded; seeds, glabrous tubercular verrucose. It is frequently cultivated. The root, leaves, flowers and bark are used in diseases caused by excessive phlegm, also in menorrhagia and in rheumatism.—H. Kraemer, in Proc. N. C. Assoc., 1894.

Adhatoda Vasica.—The leaves and stem known as Adlusa are used in India as an expectorant and for pulmonary troubles.—Pharm. Post, 1894, 531.

Barleria Prionitis Linné, (Katukarandu). A bush 2–5 feet high, usually very prickly. Leaves, entire; flowers, axillary; fruit, a capsule. Occurs in tropical India from the Himalayas to Ceylon and Malacca, probably in most cases introduced as it is used for the preparing of hedges. It is said to be a cooling diuretic and tonic. The whole plant is used in urinary and paralytic affections, rheumatism, jaundice, hepatic obstruction and dropsy.—H. Kraemer, in Proc. N. C. Assoc., 1894.

Hygrophila Spinosa T. And.—The seeds are used as an aphrodisiac in India, and when taken in the mouth become covered with a viscous slime that adheres to the tongue. The root is used as a diuretic and cholagogue.—Pharm. Post, 1894, 531.

ALGÆ.

Formation of Substance in Sea Algæ.—A. Hansen.—The Phæophyceæ (especially Dictyoma) do not produce starch, but fat. The substance found in the cells of the inner cell-layer of the thin sprouts, which Berthold supposed to be albuminous, gives the micro-chemical reaction of fat. The cells serve as a storing-place for the fat which is produced in the assimilative tissues. Fat was also found in Taonia atomaria and in Halyseris polypodioides, whilst oil could be detected in Asperococcus hydroclathrus and in Cystosira. The production of substance in the

Florideæ seems to be more complicated. The cells of the assimilative tissues of Chondriopsis cærulescens contain a globular substance which reflects light in a peculiar manner, and, according to Kny, gives rise to the iridescence of this plant. Inasmuch as no oil or starch, etc., could be found in the cells, this substance is probably a food. It swells up in water, dissolves in alcohol, and becomes dark when treated with osmic acid, and brown when treated with iodine. A starch-like substance was only found in Gracilaria. An examination of the dyes of sea algæ indicated that the red color of the Florideæ is the albumin compound of a dye, like hæmoglobin. The green color of the Florideæ can be separated into a yellow dye and a green dye, probably ordinary chlorophyll. Many of the Florideæ are almost green, and these grow near the surface; the deeper growing ones increase in redness the deeper they occur. It is assumed that the red dye absorbs the dissolved oxygen of the water.—Bied. Centr., 1894, 544; from Naturw. Rundsch., 1893, 73.

Influence of Arsenic Acid upon the Vegetation of Algæ.—R. Bouilhac.—Stichococcus bacillaris Nagelii lives and reproduces itself in mineral solutions containing arsenic acid. Other algæ besides stichococcus are able to vegetate in nutrient solutions containing arsenic acid. Under these conditions these algæ are capable of assimilating arsenic acid. The addition of arsenic acid to a nutrient solution free from phosphoric acid causes the algæ to flourish. In this case the arsenates can be substituted for the phosphates.—Compt. rend., vol. cxix., No. 22.

Fixation of Free Nitrogen by Algæ.—P. Kossowitsch.—Frank, and Schlœsing and Laurent, have shown that soil bearing a growth of green or bluish-green algæ gained nitrogen from the free nitrogen of the air, and the results were confirmed by Koch and Kossowitsch; but the question whether the soil bacteria took any part in the fixation remained undecided. —Bot. Zeit., 1894, 97; Jour. Chem. Soc., 1895, 59.

Cryptoglena Americana.—B. M. Davis (Bot. Gaz., 1894, 96) describes a new unicellular blue-green motile organism from a salt-marsh near Cambridge, Mass. In the motile condition it consists of a swarm-cell about 8–10 μ long and 5–6 μ broad, with two unequal cilia at one end. It contains six to ten peripheral disc-shaped bodies which are apparently true chromatophores, and one or two bright red pigment-spots. It occurs also in a non-motile condition, which is possibly identical with Polycystis pallida. In this state the cells contain blue-green chromatophores, one, two, or rarely three pigment spots, and a well-defined nucleus with a distinct nucleole.

AMARANTACEÆ.

Ærura Lanata (Polkudupala).—Much employed for coughs, as a vermifuge for children, and in indigestion.—H. Kræmer in Materia Medica of Ceylon, in N. C. Pharm. Asso. Proc., 1894.

Amarantaceæ of Brazil.—T. Peckolt (Pharm. Rund., 1895, 89) describes the following medicinal and otherwise useful plants: *Telanthera ficoidea Moq.*, an infusion of which is used in urinary troubles. *T. polygonoides Moq.* is a universal "heal-all." The root is used as tonic, etc. *T. ramosissima Moq.*, the flowers when made into a tea are used in diarrhœa, etc.; and in the form of a syrup employed in coughs. The same properties are possessed by *T. brasiliana Moq.* *Gomphrena paniculata Moq.*, tea of the leaves is employed as a diaphoretic and considered excellent for wounds of the beasts of burden. *G. mollis Mart.* yields a root that is valued as a tonic and carminative. *G. Pohlii Moq.* has a knotty resinous root that is valued in rattlesnake bite. *G. officinalis Mart.* is used in the form of an infusion, tincture and alcoholic extract in typhus and intermittent fever, paralysis, colic, diarrhœa, etc. It contains 0.77 per cent. of an amorphous, yellow, bitter principle, soluble in hot water, alcohol and ether. Solutions of tannin, sublimate and gold chloride produce precipitates with this principle. He also found 0.085 per cent. of saponin; 0.11 per cent. of a yellow soft resin of a disagreeable aromatic odor; 1.148 per cent. of a yellowish-brown resin, odorless but of an acrid after taste; 2.5 per cent. of a dark brown, odorless resin. Similar in properties to *G. officinalis* are *G. macrocephala St. Hil.*, *G. macorrhiza Mart.* and *G. leucocephala Mart.* *G. globosa Linn.* is called "immortelle" and the flowers are officinal. *Iresine vermicularis Moq.* possesses a fleshy stem, and a tea of the leaves is used in catarrh and as a dressing for wounds and in eczema. *Euxolus viridis Moq.*, a decoction of the leaves is a mild diuretic. The leaves are cooked with meat and the seeds are prized like millet. *E. oleraceus Moq.* contains water, 81.450; fat and soft resin, 1.979; albumen, 0.300; chlorophyll, extract, etc., 5.885; ash, 4.145. *E. caudatus Moq.* is also prized like the former as a vegetable. *Amarantus flavus L.*, the root of which is used as a diuretic. *A chlorostachys Willd.* is prized as an ornamental plant. *A. spinosa L.*, the old leaves are a mild purgative. *A melancholicus Moq.*, the leaves are employed as alterative and the root is officinal as diuretic. *Chamissoa macrocarpa H. B. K.* is used in malaria in form of colature 60 : 500. A decoction of the root is considered specific in gravel. *Celosia brasiliensis Moq.*, a tea of the flowers is employed in hemorrhage, blenorrhœa and dysentery. A decoction of the seeds is employed in ophthalmy.

ANACARDIACEÆ.

Holigarna and its Blistering Principle.—David Hooper (Pharm. Jour. Trans., 1895, 1197) writes concerning some specimens of fruits of *Holigarna ferruginea*. The fruit is a drupe, ovoid or elliptical in shape, black colored, about seven-eighths of an inch long and one-half inch in diameter. The pulpy pericarp becomes thin when dry and is of a uniform black color, but the pulp, when fresh, is greenish and mucilaginous. The testa is thin and dark brown and encloses a whitish starchy pair of plano-convex

cotyledons with dark-colored veins running through them. The embryo is suspended from below the apex of the fruit, and the minute radicle is situated next the hilum. The pericarp consists of mucilage and a tannin (green with Fe_2Cl_6). The pericarp also contains an active vesicating principle associated with a black resinous substance forming a varnish. This acrid principle was found to be anacardic acid. And it is further evident that the fruit contains a body allied to, if not identical with, cardol. The seeds, when dry, had a peculiar odor of ceratonia pods. They contain 12.4 per cent. gallic acid, 8.5 of fat and 3.7 of mineral matter. Basiner's test for the marking nut shows the same results as applied to similar preparations of holigarna. The holigarnas possess similar properties to those of semecarpus anacardium and anacardium occidentale.

Rhus toxicodendron and R. venenata.—F. Pfaff stated that it is the general opinion that Rhus toxicodendron and Rhus venenata contain a volatile proximate principle, which causes the well-known dermatitis venenata.

Maisch's toxicodendric acid has been generally accepted as the active poison. He could not believe that a very volatile substance is the cause of the trouble, as this would be contrary to the pharmacology of vegetable skin irritants. He isolated Maisch's toxicodendric acid in the form of barium salt, and found it non-toxic. The same is true of a solution of the free acid in water. As the real active principle he found a non-volatile oil. This oil, when applied to the skin, causes the well-known eruption. Photographs demonstrating the effect of the oil upon the human skin were shown. As preventive treatment Pfaff proposed a thorough washing with water, soap and brush, or, still better, a repeated thorough washing with an alcoholic solution of lead acetate. The oil being soluble in alcohol, and forming a nearly insoluble lead compound in alcohol, is thus best removed from the superficial skin. Further investigations will be undertaken, and an attempt made to classify Maisch's toxicodendric acid and the new poisonous oil, which seems to be of the kind called cardol, obtained from Anacardium occidentale. These two oils are, however, not identical.—Pharm. Jour. Trans., 1895, 818. (See also Pharm. Zeit., 1895, 339.)

APOCYNACEÆ.

Species of Strophanthus.—An illustrated monograph of this genus has recently been published by Franchet in the Nouvelles Archives du Museum. *S. boivini*, H. Baill.; *S. tholloni*, Franch., and *S. courmonti*, Saccleux, are remarkable for not having tailed appendages to the corolla lobes, which in the first-named species are quite obtuse, while in *S. barteri*, Franch., *S. congoensis*, Franch., they scarcely exceed ½ inch; in *S. parviflorus*, Franch., and *S. amboensis*, Engl. and Pax., and *S. ogovensis*, Franch., they are about 1½ inch, and in *S. bracteatus* they reach a length of nearly six inches. *S. tholloni* has the long-tailed anthers of the *roupellia*

section, and long tapering scales in the throat of the corolla, nearly equalling the lobes in length, and the other species present every gradation in length and shape of the corolla scales and in the length of the awn of the seed, showing that the species, although exhibiting great variation in the shape and size of the flowers, form a closely-connected series. Franchet points out the curious fact that there is a relation between the glabrous character of the seeds and the length of the tail or appendage which crowns the connective of the anthers. Guided by this relation, Franchet concludes that the only two African species thus furnished, viz., *S. gratus* and *S. tholloni*, are the sources of the smooth strophanthus seed of the Gaboon. This monograph forms a most valuable addition to our knowledge of the genus, the species of which, as now enumerated, have reached the number of thirty-five.—Pharm. Jour. Trans., 1894, 253.

Strophanthus Glaber.—The exact botanical source of the seeds that have been known in commerce under this name has never been accurately determined. Franchet suggested a few months ago that they were probably derived from the plant known as roupellia grata, but as the fruits of the plant were not well known, the point remained doubtful. He has now received fruits from a cultivated plant of this species, which enable him to confirm without doubt his previous opinion, and to further show that, as suggested by Baillon some years ago, the genus roupellia must be sunk under strophanthus as a section or sub-genus. Consequently strophanthus gratus, Franch., will be the name in future for the plant yielding the glabrous strophanthus seeds of commerce. Franchet believes, however, that some of this seed may be yielded by the closely allied species, S. tholloni, which has the same geographical distribution. (Jour. de Botan., viii., 201.)—Pharm. Jour. Trans., 1894, 72.

Pereiro Bark.—O. Hesse has not met with a second variety of pereiro bark, and is of opinion that the source of vellosine cannot strictly be regarded as such.—Ann. der Chem., 1895, 195.

Carissa Ovata.—A variety of this somewhat rare plant (var. *stolonifera*, F. M. Bailey) has been subjected to examination by T. L. Bancroft. He has extracted from the plant a crystalline principle which is very bitter, and is apparently a glucoside. The crystals are very soluble in water, less so in dilute spirit, slightly soluble in absolute alcohol, and insoluble in ether or chloroform. Strong sulphuric acid gives no coloration with the crystals, but ammonia gives a yellow color. Auric chloride and tannin give slight precipitates with the solution of the crystals, but mercuric chloride gives none, nor does potassio-iodide of mercury. The crystals are deliquescent, and when exposed in a thin layer to the air for a few days they assume a green color. They reduce an alkaline solution of cupric oxide. At first Bancroft suspected that this principle might be identical with ouabin, since the genus *Carissa* is closely allied to *Acokanthera*, and the

alcoholic extract of the bark rapidly killed frogs when subcutaneously injected, the heart stopping in systole and the muscles being pale and paralyzed. He now believes, however, that it is quite distinct chemically. Bancroft suggests that the allied species, *C. xylopicron*, which is used in diseases of the urinary organs, might be worth a trial in Europe, the Brisbane plant being scarce.—Pharm. Jour. Trans., 1894, 253.

The Seeds of Yccotli.—The *Thevitia Yccote* A.DC. (*Cerbera thevitioides*, Kunth), of Mexico, is one of the most poisonous of the *Apocoynaceæ*. The *T. ovata* A.DC., *T. cuneifolia* A.DC., var. *Andrieuxii*, and *T. glabra*, all these species and varieties are known in the State of Jalisco as Narcisos amarillos.—Brit. and Col. Drug., 1894, 163.

ARALIACEÆ.

Ginseng Culture in America.—Geo. Stanton (Pharm. Era, 1895, 359) gives the following facts: The 30,000 seeds sown in forest nursery beds in the autumn of 1892 came up about the first of May, 1894, producing about 25,000 plants, which will be ready for transplanting next fall. His plants in garden made good growth through the season, though the season was rather unfavorable. He has taken this season from seven beds, 3x16 feet each, 2,234 roots, weighing 131 pounds. From these were taken out 1,906 roots, 50½ pounds, for transplanting, leaving 80½ pounds to be dried for market, making 29¾ pounds dry, which he sold for $5 per pound; 629 seedling roots, worth $2 per 100, were also taken from the same beds, and not included in above figures. The plants had been under cultivation, one bed five years, the other four years, and had produced at least $75 worth of seeds during the time. The first cost of stocking the beds with wild roots was less than $25. It will be observed that the stock has been decreased only 328 roots. He has now in garden 38 beds stocked with roots and seeds, 25,000 seedling roots in forest, 21,000 seeds sown in forest, from which plants are expected next spring, and this season's crop of seeds on hand ready to be sown the coming season. He has also furnished the public during the past four years with over 60,000 seeds and about 1,500 roots for cultivation.

It is evident that a quantity of ginseng can be produced by cultivation that will command a higher price than the wild root. His cultivated root in 1893 sold for $4 a pound, while the best price he received for wild root was $3.50. In 1894 the cultivated sold for $5, the wild for $4.35.

Ginseng.—Among the products of Corea peculiar to itself is that of ginseng, a root of great medicinal value. The demand for it is so great that many other roots are substituted for it, especially a kind known in commerce as American ginseng, imported from the United States. The finest kind of root grows wild in the mountains of Manchuria. At one time this particular kind was considered of so fine a quality, and in consequence becoming so scarce, that an Imperial edict was issued prohibiting

its collection. Its value varies from three to twenty pounds sterling per ounce. Roots of this latter quality can only be purchased by the wealthy. The real Manchurian ginseng is only found in the upper valley of the Usuri, where ruined towns and forts mark the cradle of the race which seven centuries ago ruled over China from the Yellow River to the great wall.

The genuine Manchuria consists of a stem from which the leaves spring, and of two roots branching off at the same point from each side of the centre root. The stem somewhat resembles the head and neck, and the side roots the shoulders and arms of a man; the main root represents the body, and a fork which the roots frequently form, the legs. The Coreans, with a not ungrateful feeling, believe that a plant, which thus expands into the human form amid thickets and jungles on which the foot of man has never trod, must be intended to alleviate the sufferings of the human race. Its precious qualities are increased and intensified by age, and a plant is of no great value until it has been growing and gathering strength for at least an ordinary lifetime. The age, and, consequently, the value of a plant, are ascertained by a careful examination of the upper portion of the centre and side roots. These portions should be covered with rings, and the thicker and more numerous the rings the greater the age. The value of ginseng in no way depends upon its length, thickness or color. The upper portions of the root also possess healing power. The stem which appears above ground, on the other hand, ought not to be eaten. It is supposed to be hurtful rather than beneficial.—Brit. and Col. Drug., 1894, 362.

ARISTOLOCHIACEÆ.

Bragantia Wallichii, *R. Br.*—A shrub of India and Malaya. The roots are light brown in color, knotted and twisted, about one inch in diameter at the thickest part, and tapering. The cortical portion is soft and corky. The substance of the root is tough in consistence. The odor of the bruised root is terebinthinate and the taste nauseously bitter. A transverse section of the root shows a rather remarkable appearance. There are no very evident concentric zones in the wood, but it is broken up in a radiating manner into thin wedge-shaped masses extending in some instances from the cambium to the centre of the root. There is no proper pith, and the parenchymatous system is distributed in alternating layers with the wedge-like bundles of wood like exaggerated medullary rays. Wood cells are long and yellowish brown. Parenchyma contains a large quantity of starch almost white in color.

Its constituents are a soft neutral resin, golden-brown color, giving a reddish-brown solution with sulphuric acid; a golden-brown resin acid. The resinous bodies are not analogous to *aristolochin*, found in several species of Aristolochia. It also contains an alkaloid giving a greenish-red solution with sulphuric acid; a yellowish one with nitric acid, destroyed

the red color of potassium permanganate, and afforded a crystalline acetate. The alkaloid is probably allied to *aristolochine*, the source of bitterness in certain plants of this order. A substance related to dulcite was also present.—David Hooper in Pharm. Jour. Trans., 1894, 231.

ASCLEPIADACEÆ.

Calotropis Gigantea.—R. Br. (Wara.)—A shrub with thick herbaceous branches, bark thick, soft, wrinkled, ash-colored. The young shoots, under-sides of the leaves and inflorescence, are covered with soft woolly trichomas. Flower, purplish, lilac or white; flowering nearly throughout the year. One of the most common plants in dry waste places. The fibre from the inner bark was formerly used for the manufacture of cloth for the princes and nobles. The hairs of the seeds are said to be made into thread in Borneo. Attempts to weave it have been made in Madras. Gunpowder charcoal is made from the young branches. The bark is described, with analysis made therefrom, in the Pharmacographia and the National Dispensatory. All parts of the plant are full of an acrid milk which possesses powerful medicinal properties. The green leaves are locally applied to dispel swellings. The root is a useful tonic, good in coughs and catarrhs. The milk of the plant is internally used as a cure for leprosy.—H. Kraemer, in Proc. N. C. Assoc., 1894.

Drega Volubilis.—Benth. (Kirianguna).—A stout, tall climber, branches often pustular Leaves ovate, sub-orbicular or cordate-acuminate, rather coriaceous. Peduncles slender, umbels drooping, stigma dome-shaped. Follicles ¾ x 1½ inches, broadly lanceolate, turgid, glabrous. Given in mild fever to children and also to women after child-birth to improve the secretion of milk. It is also said to cure asthma.—Ibid.

Hemidesmus Indicus, Br.—(Iramusu.)—It is a twining shrub, leaves opposite, hoary beneath and variable in form; corolla green without, purple within: follicle, 4–5 inches. The root is used to purify the blood, promote appetite, cure skin diseases and syphilis. It is called native sarsaparilla. It was introduced into England, and the syrup, like that of sarsaparilla, is there used as a flavoring in medicine.—Ibid.

BALANOPHORACEÆ.

Balanophoraceæ of Brazil.—T. Peckolt (Pharm. Rund., 1895, 33) considers the following: *Lophophytum mirabile*, Schott and Endl., a parasitic plant, is indigenous to several of the Brazilian States and known to the natives under various names. It possesses tubercular rhizomes, which send up several shoots through the soil of the size of an ear of corn. The dried and powdered tubercules are employed to a small extent by the natives and Brazilian quacks ("curiosos") for the cure of epilepsy. *Langsdorffia hypogaea*, Mart., a parasite thriving on the roots of plants belonging to the Moracæ, Palmæ, and other families. The author found it also growing

upon the root of the coffee plant. The tubercular thickening of the rhizome has been found to contain a fatty oil, starch, a bitter principle, resin, 3.21 per cent. of wax, and 0.036 per cent. of cumarin, but no tannin. The flower stalks and receptacles are eaten by the natives for their supposed aphrodisiac properties; the quacks give the tubercular rhizome for the same purpose.

BIGNONIACEÆ.

Oroxylum indicum, Vent. (Totila).—A glabrous tree with a thick bark; leaves opposite, large, two or three times pinnate; leaflets ovate, entire, peduncle very thick; raceme ten inches; capsule 1–3 feet by 2–3¼ inches thick, margins somewhat incurved, valves woody. The bark is employed as a bitter tonic. It reduces rheumatic swellings, dispels phlegm, and checks diarrhœa, dysentery and fever.—H. Kraemer, in Proc. N. C. Assoc., 1894.

BIXINEÆ.

Gynocyanauridzarin, an Antitubercular.—R. G. S. Chew (Louisville Med. Monthly, Vol. II, p. 41) publishes the results of his experiments with the East Indian plant gynocardia lancifoliata. He treated the leaves, roots, and seeds of the fresh plant by consecutive maceration, under high pressure, in benzin, chloroform, petroleum ether, carbon disulphide, and rectified ether, then filtered, evaporated the filtrate over a water-bath, and, having mixed the residues, digested them in ammoniated alcohol, and allowed to stand for 24 hours. Then the supernatant clear liquid was decanted, and, after successive treatment with madder, precipitated aurum, hydrogen peroxide, and potassium cyanide, was raised to the boiling point, maintained at this temperature for half an hour, and then set aside to cool. Forty-eight hours later a precipitate had formed, consisting of light, greenish-yellow, slightly opaque, acicular crystals, having the composition

$$(C_9H_{21}O_7)_2(KCNO)Au_3,$$

to which he gave the name "Gynocyanauridzarin," as expressive of their origin. These crystals are very unstable, rapidly losing their crystalline form (after removal from the mother-liquor, in which they will not redissolve) and decomposing to a greenish-gray, highly poisonous paste. They are freely soluble (10 in 3) in cinnamic alcohol, not at all in benzin, chloroform, carbon disulphide, alcohol or ether, and very sparingly (1 : 5000) in any of the animal or vegetable oils; if the oil contain cinnamic alcohol the solubility increases to one in eighty. Chew administered this drug dissolved in olive oil and cinnamic alcohol in such proportion that one minim shall exactly contoin 0.00001 Gm. of gynocyanauridzarin. This mixture the author labeled "C. O. N," for short, and gave 3 to 20 minims of it 3 times daily, in various forms of tubercular affection. He carefully noted the effects of C. O. N. on 1900 artificially obtained (*i. e.*,

per inoculation of discharges and sputa) cases of leprosy, leucoderma, lupus, scrofula, syphilis in the tertiary stages, phagedena, phthisis, psoriasis, and tuberculosis among the lower animals, and on 256 lepers. Being satisfied with these results, he offered the drug to the public. After some little trouble he got a committee of twenty-nine experts, it is stated, to watch the progress of twelve lepers under the C. O. N. treatment. In all cases the prognosis was favorable, and finally they were ultimately discharged cured. The shortest time occupied for a cure was eighty-six days, and the longest 400 days; but 180 days was the average of short cases. It is to be hoped that the above report may be substantiated by clinical experience.

BORAGINEÆ.

Piptocalyx Moorei.—Further details concerning the history of this product have been furnished by J. H. Maiden (Pharm. Jour., No. 1287, p. 60). He first received the leaves in November, 1892, under the name of "bitter vine," with the statement that a settler intended making a dye with it. It came from the Guy Fawkes district, over 400 miles north of Sydney, in the Snowy Range. It is stated to grow in the scrub to a height of 15 feet up the trees, but in the open only to 2 or 3 feet. The leaves are said to be used by dyers. A half-penny per pound is paid for picking them in the green state, and a handy man can pick about 150 pounds per day. The vines will only stand stripping every other year. The plant in its wild state occurs only in belts within sharply defined limits. It appears to propagate chiefly from the root and from plants one year old, which send down white fibrous roots into decayed leaves, which thickly cover the ground on which they lie, and trail sometimes to the length of several yards.

BURSERACEÆ.

Burseracea—Opoponax.—A. Tschirch examined this product and describes it as comprising large brownish-yellow pieces, consisting in large part of plant tissues, a few small pieces of gum and some $CaCO_3$. To paper it gives an oily appearance. Its odor is peculiarly agreeable. Older pieces are darker and have the odor of sumbul. The taste is burning, somewhat acrid and bitter. It consists of resin, 19 per cent.; ethereal oil, 6.5 per cent.; gum, plant tissues, etc., 70 per cent.; water and loss, 4.5 per cent.—Arch. der Pharm., 1895, 209.

CACTACEÆ.

Cactus Grandiflorus.—Gordon Sharp and Hoseason have examined a number of specimens of this plant—the night-blooming cereus (cactaceæ)—but failed to find in them either glucoside or alkaloid. They have found, however, that the plant contains a series of resins, one or more of which are soluble in normal saline solutions, and such medicinal activity

as it possesses is probably due to these. Pectin and gum are also present, together with a small amount of sugar. The resins are completely removed by absolute alcohol, almost wholly by absolute ether, less perfectly by chloroform or rectified spirit. Pharmacological experiments, of which details are given, were performed with solutions of the pure resinous extract in normal saline solution (0.75 per cent.). The resins had little or no effect as compared with digitalis, and the result of the experiments appears to indicate that the plant is pharmacologically inert. At most it has some slight diuretic action.—Practitioner, liii., 161.

CAPPARIDEÆ.

Cratæva Roxburghii, now *C. religiosa var. Roxburghii.* (Lunuwarana.)—A tree with three-foliate leaves, the latter small, ovate, lanceolate, abruptly acuminate; berry globose. The leaves are employed as a remedy for gouty swellings. The bark is used as an appetizer and in diseases of the urinary organs.—H. Kraemer, in Proc. N. C. Assoc., 1894.

CAPRIFOLIACEÆ.

Sambucus ebulus, L.—Moeller draws attention to the histological characters of elder root. This root appears to be poisonous in its fresh but not in the dry state. The distinctive characters of the powdered root are the crude bast fibres, the brown contents of the laticiferous tubes, which appear in the form of spheres, or drops, or in masses, and the fragments of wood with the cells of the medullary rays attached to them. These particulars permit of the powdered root being distinguished from belladonna; if the powder of the latter be prepared from the starchy autumnal root the size and character of the starch grains may also be utilized for the purpose of diagnosis.—Pharm. Post., 1895, 113.

Adulteration of Flores Sambuci.—These flowers are known to be adulterated with the flowers of other species of sambucus and spiræa, which are easily discerned by the color, odor and appearance of the stem. Lately some sambucus flowers of commerce were found to contain the flowers of achillea millefolium. S. Rützon detected by means of the round, somewhat white, more yellowish starch grains an adulteration of panicum milaceum.—Pharm. Runds., 1894, 214; from Nordisk. Farm. Tidskr., 1894, 11.

CARYOPHYLLACEÆ.

Tannin of Cloves.—Wm. L. Peabody finds the percentage of tannin to range from 10 to 13 per cent., and that it yields the same decomposition products and has the same composition as gallotannic acid.—Amer. Jour. Pharm., 1895, 300.

CHENOPODIACEÆ.

Chenopodiaceæ of Brazil.—T. Peckolt (Pharm. Runds., 1895, 89), de-

scribes the following medicinal plants: *Chenopodium hircinum* Schrad. has leaves which, when fresh, give a strong goat-like odor when rubbed, and are used as an emmenagogue in hysterical affections and menstrual colic. 10 kgms. of the fresh plant gave upon distillation 29 Gm. of an ethereal oil, which is yellowish, of aromatic and disagreeable odor and somewhat bitter taste. Its sp. gr. at 15° C. is 0.911. It is soluble in alcohol of sp. gr. 0.840, the solution becomes saturated with H_2S gas upon passing the same therein, and after a time there separates a mass possessing an odor of peppermint. Iodine is dissolved without rise in temperature. *Chenopodium ambrosoides*, L., a cosmopolitan plant whose medicinal properties have been known for a long time as useful in ascarides and as an emmenagogue. 10 Kgs. of the described seeds yielded 3.540 Gm. of an ethereal oil (10 Kgs. of fresh seeds yielded 65.872 Gm.), that is yellow, of strong aromatic odor, and sp. gr. at 15° C. is 0.943. It is used as an anthelmintic in doses of 2 to 4 drops with sugar and castor oil. *Traganum scariosum Frieire Allemao*, a small tree with a brown smooth bark, a decoction of which is employed in intermittent fever.

CHLORANTACEÆ.

Chlorantaceæ of Brazil.—T. Peckolt (Pharm. Rund., 1894, 240) considers *Hydiosmum brasiliense*, Mart., a small tree or shrub. The flowers are in dicœcious aments. The leaves and flowers possess an odor somewhat resembling musk. The infusion of 10 Gm. to 160 Gm. of mixture is said to be useful in fever and cold, taken in teaspoonfuls. The tincture, being 6 to 8 Gm. in 120 Gm. of water, is used in teaspoonful doses every hour or two in migraine and rheumatism; 5 to 8 drops are tonic. A handful of the flowers with a flask of wine are prized by the people as an aphrodisiac.

COMPOSITÆ.

Centaurea behen, L.—This plant grows between the Persian Gulf and Bombay in large quantities. There is a white and red variety. Both are prized by the Arabian physicians, and the root is employed as a strong aphrodisiac.—Pharm. Post., 1894, 531.

Haplopappus Baylahuen.—The drug "Baylahuen," recently introduced into commerce, consists (Chem. News, 1894, 285) of the leaves and stems of the *Haplopappus baylahuen*, a plant belonging to the Aster family of the order Compositæ. It is indigenous to the Cordilleras of the Chilian province Coquimbo. The stem is woody, and the leathery leaves are somewhat crowded together. They are from 2 to 2½ Cm. long, and at their broadest part, which is just above the middle, they are up to 1 Cm. broad. They are distinctly serrated, especially at the apex; and at their base they are somewhat sheathed. The plant is especially characterized by a yellow, strong-smelling viscid substance, which not only covers the leaves, but most parts of the stems. This substance causes the plant to appear as if

it had been dipped into some resinous mass; but a section of the leaf shows that this covering forms a coherent crust, which, especially with young leaves, is greater in thickness than the layer of epidermal cells lying underneath. Plants possessing this characteristic viscid covering were recently subjected to a special examination by Volkens. According to this examination it appears that this peculiarity is to be found among several of the Chilian compositæ, especially those of the haplopappus species. The viscous substance is generally secreted by hair-like glands. In the case of haplopappus baylahuen, these special glands consist of an agglomeration of numerous cells. The surface of the leaf is somewhat depressed round each gland, so that the glands as a rule do not protrude far above the surface of the surrounding epidermal cells. These gland hairs are closely distributed in large numbers over the upper and under side of the leaf. The cells toward the outside of these gland-hairs contain a small amount of crystals of oxalate of lime. It is to be remarked that all the membranes of the gland-hairs, and also the cells at the base, do not consist of pure cellulose. They are insoluble in sulphuric acid. Iodine and sulphuric acid, or chlor-zinc iodine, colors them intensely brown, and alkannin solution red, proving them to be of a suberous nature. The inner cells of the hair-like glands are lignified, which may be proved by the red coloration caused by phloroglucin and hydrochloric acid. In Chili the drug is used internally as a stimulant in cases of weak digestion, and as an emmenagogue. Outwardly, it is used for healing wounds of animals. According to Baille, the decoction is a splendid remedy for diarrhœa and in cases of acute and chronic dysentery. Its medical properties are regarded as being due especially to the resinous combination contained in the drug.

Active Constituent of the Pellitory of Medicine.—W. R. Dunstan and H. Garnett.—The similarity in the physiologieal effect produced by Piper ovatum and by the pellitory of medicine (Anacyclus pyrethrum) led the authors to examine this plant, the activity of which is usually ascribed to a resin. The authors have separated from this resin a crystalline intensely active substance, which they name pellitorine. In most of its chemical and physical properties it closely resembles piperovatine; but so far it has always exhibited certain small differences which may possibly disappear when the substance has been further purified. Both piperovatine and pellitorine appear to be pyridine derivatives, but neither possesses any appreciable basic power.—Chem. News, 1895, 33.

Insect Powder.—S. E. Jelliffe, in some experiments, seems to find that the powdered stems are less powerful in their insecticidal properties than the flowers. He gives drawings of tissues distinguishing the flowers from the stems.—Drug. Circ., 1895, 5.

CONIFERÆ.

Volatile Oil from Canada Balsam.—H. L. Emmerich obtained from fraction i. (See Proc. Wisconsin Pharm. Assoc., 1892, 66; and Amer. Jour. Pharm., lxvii., 9) 10.85 per cent. of bornyl or terpinyl acetate. It has now been fractionated, and from that fraction at 180°+ a small amount of crystals resembling borneol was obtained. In fraction iii. pinene was also ascertained. Fraction viii. compared with Kressin's constants (*loc cit.*) the relative density had increased 0.211, and its optical activity had decreased 5.893°. Fraction ix, had separated into two strata: the lower of a terebinthinate odor, and the upper stratum of a pleasant fragrance, reminding one of lemon oil. Fractions i. and ix., on analysis, show that this oil is much more complex than was supposed.—Amer. Jour. Pharm, 1895, 135.

Novel Hydrocarbon in Fir Tar.—A. Renard describes a novel hydrocarbon occurring amongst the products of distillation of fir tar, which is probably a member of the aromatic series. When purified it is a colorless liquid, boiling at 254°–257°. Its density at 0° C. equals 0.9419, its refractive index is 1.507, and it is without action on polarized light. Its analysis and vapor density indicate its formula as $C_{14}H_{22}$. Exposed to air it becomes brown in color, but hydrochloric acid does not affect it. With bromine it forms colorless crystals of a tetrabromide derivative, $C_{14}H_{18}Br_4$, and an unstable dibromide, $C_{14}H_{22}Br_2$, may also be prepared. A nitro-derivative, $C_{13}H_{21}NO_2$, is formed by the action of fuming nitric acid upon an acetic solution of the hydrocarbon, and a sulphonic derivative by the action of sulphuric acid. The latter, when separated, distilled, and otherwise purified, yields about 15 to 20 per cent. of a saturated hydrocarbon that boils at about 250°–253°, corresponds to the formula $C_{14}H_{26}$, and is unaffected by the strongest acids. The sulphonic acid remaining in solution may be separated by precipitating it as an ammoniacal salt, which is very soluble in water. The acid also forms an insoluble barium salt $(C_{14}H_{21}SO_4)_2Ba$. The last reaction noted of the hydrocarbon. $C_{14}H_{22}$, is the very marked blue coloration produced on treating it with a mixture of sulphuric acid and alcohol. This, according to Maquenne, is characteristic of the aromatic hydrides. The partial transformation of the new compound, when treated with sulphuric acid, into a saturated hydrocarbon, may be compared with the transformation of heptinene, C_7H_{12}, into toluene hexahydride, and it may possibly be correct to regard it as bi-heptinyl, $C_7H_{11}—C_7H_{11}$, or bi-tolyl octo-hydride $(H_4—C_7H_7)—(C_7H_7—H_4)$. This formula also accords with the transformation of the compound into a saturated hydrocarbon or bi-tolyl dodecahydride $(H_6—C_7H_7)—(C_7H_7—H_6)$, by fixation of four atoms of hydrogen.—Pharm. Jour. Trans., 1894, 354; Comp. Rend., cxix., 625.

Pine Tar.—A. Renard finds (Compt. Rend., 1894, No. 25), that the

proportion of guaiacol in the creosote of pine is intermediate between that of the beech and the oak.

Investigations of Succinite.—A. Aweng (Arch. der. Pharm., 1894, 660) has investigated the constituents of that variety of amber known as succinite. This resin, which is formed in the stem and branches of *Pinus succinifer*, appears to be of both physiological and pathological origin. From 20 to 25 per cent. is soluble in alcohol, and consists principally of free succino-abietic acid, together with a small quantity of the same acid combined with borneol, representing probably the last trace of the volatile oil of the amber tree. By fusion with caustic potash succino-abietic acid is partially converted into succinic acid. That part of amber which is insoluble in alcohol, and has been termed succinin, proved to be insoluble in all the menstrua experimented with. Weak alcoholic solution of potash slowly decomposed succinin into succinic acid and a resinol, succino-resinol. The only solvent that could be found for this body was a mixture of ether and alcohol; its formula was determined to be $C_{10}H_{20}O$. Other varieties of amber were also examined. Gedantine appears identical in appearance with succinite; glessite also resembles the latter, but contains a body resembling in odor carvol in the place of borneol; allingite, on the other hand, contains neither borneol, succinic acid nor succino-abietic acid.

CONVOLVULACEÆ.

Lactiferous Cells in the Convolvulaceæ.—E. Czapek. (Bot. Centralb.; 1894, 267) finds that all convolvulaceæ secrete a milky juice. They contain a series of cells, the transverse walls of which are not absorbed; the membrane is thin, and ultimately suberizes. These lactiferous cells are developed in the embryo, and follow the course of the phloem-bundles.

Evolulus alsinoides, Wall. (Vesnu-kranti). This is now placed under *Breweria evolvuloides*, Chois. A very much branched, rough, small shrub, with a few scattered strigose hairs. Leaves, oblong, small; flowers, small, axillary 1–3 together, whitish or pinkish; capsule sub-globular, 4 valved; seeds, glabrous. The whole plant is employed as a tonic and appetizer; it is a pleasant bitter and also used in mild cases of fever.—H. Kraemer, in N. C. Proc., 1894.

Ipomæa beladambœ, Roem. and Sch. (Bimtamburu). An extensively trailing plant of Ceylon, abundant in damp fields. An oil obtained from this species is said to check giddiness and to keep the head cool.—Ibid.

Ipomoea hederace, Jacq.—The seeds known in India as Kálá-dánah, are official in the Indian Pharmacopœia in the form of an extract, tincture and resin, and used as a substitute for jalap. The resin is the active principle, and is a mild and sure cathartic.—Pharm. Post., 1894, 531.

Scammony Resin.—H. Spirgatis cannot admit that the analyses of the barium salt obtained from scammony resin, which were made first by him-

self, and then by Mayer, are incorrect as suggested by Poleck.—Arch. der. Pharm., 1894, 241.

Colocynth in Palestine.—Wallace in a Report to the State Department at Washington (Jan. 25, 1895,) says that the colocynth grows abundantly on the maritime plain that lies between the mountains of Palestine and the eestern shores of the Mediterranean. It is found from below the city of Gaza on the south to the base of Mount Carmel on the north. The dwellers along this plain pay little attention to the plant, and spend neither time nor labor in its cultivation. It grows without cultivation, the soil and climatic conditions producing it without the help of husbandman. With some attention the plant would undoubtedly bear a larger and richer fruit—richer in the pulp which makes colocynth valuable. But there is no object in thus improving the plant and its yield, as nature alone now supplies far more than the natives can find a market for.

The soil of this maritime plain is a light brown loam, very rich, and almost without a stone. In places where the loam has been mixed with sand the colocynth plant seems to thrive best. Very little rain falls on parts of this plain. The plant does not suffer from this lack of moisture. The climate is warm the year round, and during the summer months the heat is intense; so that the conditions necessary for the successful raising of the colocynth would seem to be good soil, somewhat sandy, a warm climate and little moisture.

The plant itself resembles our common cucumber, but its fruit is globose, about the size of an orange, of a light brown color. Its rind is smooth, thin and parchment-like. It is known as the Turkish colocynth, and is superior to the Spanish and Mogador varieties in the amount of pulp its fruit contains. The pulp constitutes 25 per cent. of the fruit. The rind and seeds are valueless.

The fillaheen, or peasants, gather the fruit in July and August before it is quite ripe. It is sold to Jaffa dealers, who peel it and dry the pulp in the sun. It is then molded into irregular small balls, packed in boxes and shipped, mostly to England. The average annual shipment from Jaffa is 10,000 pounds, though this year's shipment amounted to only about 6,000 pounds. The quantity could be increased indefinitely if there were more demand for it and a price were paid that would make it an inducement for the peasants to gather and prepare it. The price now paid for the colocynth pulp, prepared, packed for shipment and delivery on board the steamers in the port of Jaffa, is about 30 cents a pound.

There seems to be no reason why the plant should not be successfully grown in certain parts of the United States. The soil and climatic conditions are certainly adapted to it.—Amer. Drug. and Pharm. Rec., 1895, 206.

CRUCIFERÆ.

Erysimum Crepidifolium is known in Germany as *gänsetod* or *sterbe-*

kraut (goose-death or death-weed). It kills geese when eaten by them, though they eat it readily wherever they find it. W. Zopf (who has examined the plant) attributes its poisonous qualities to a volatile alkaloid.—Zeitsch f. Natur., Pharm. Centralh., 1894, 494.

CYPERACEÆ.

Cyperus rotundus, Dinne (Kalandura).—The rhizome is used in fever, diarrhœa, dyspepsia and stomachic complaints. It is also considered to be diaphoretic.—H. Kraemer in N. C. Proc., 1894.

DIOSCOREACEÆ.

Dioscorea hirsuta.—Boorsma says the tubers of this are used in Java as a food stuff. For this purpose it is necessary to cut them in thin slices and expose them for 24 hours to a stream of running water to free them from their poisonous properties. The author has extracted from the tubers two uncrystallizable alkaloids, which he has named dioscorine and dioscorecine; both are poisonous, the former being the more active.—Pharm. Zeit., 1895, 339.

DIPTEROCARPEÆ.

Dipterocarpeæ.—D. Brandis in a paper on the medicinal substances of the Dipterocarpeæ, said that from *Dipterocarpus alatus*, one of the most important plants of the order, which possesses characteristic winged seeds, was obtained that useful body known as gurjun balsam. From *Dryobalanops lanceolata* are obtained borneol, or Borneo camphor (which is not a true camphor chemically, but an alcohol, corresponding to the ordinary camphor), and the substance known as camphor oil. The best illustration of the tree (*Dipterocarpus alatus*) he could give was a tall factory chimney, with a large spreading crown of leaves at the top. Near the base of the tree a number of cavities and incisions are made, each about 12 inches by 18 inches, with a hollowed out base. Into this the sap or rather the oleo-resin flows. This wood oil, however, rapidly resinifies when it is exposed to the air, and the result is that the openings of the resin ducts become blocked up in two or three days, and no more oleo-resin flows. However, the application of fire will soon cause them to re-open and a fresh supply is obtained. The ultimate fate of these trees is that they either become weak at the base on account of the cuts, and so fall to the ground, or they become burnt by the fire and fall on account of that. Many of the species grow in a very scattered fashion and mixed with other trees, but some, such as *Dipterocarpus tuberculata*, grow gregariously, and entirely without the proximity of any other trees. This latter species gives a wood oil, which, however, is not nearly so useful as that from *D. alatus*, and which is used by the natives for making torches. Either rotten wood or caked sawdust is saturated with the oil, and made

into a kind of huge cigar with certain leaves. In addition to the light, these torches give a very aromatic odor on burning. The custom referred to above holds largely in the Malay peninsula and Burmah. This last species yields one of the most valuable timbers of Northern and Central India. In all there are 320 species and 16 genera, all of which yield an oil or oleo-resin, or oil that easily resinifies. In *Dryobalanops* the Borneo camphor is contained either in cavities or in the spaces between the fibres, and is extracted either in white or yellowish-white crystals, and special resin ducts contain the so-called camphor oil. Slides of the tissues were then thrown upon the screen, showing how the resin and oil ducts had their origin in the leaves, and then went by way of the petiole down into the stem. In *Dryobalanops* they go into the younger branches, and then divide very similarly to the fibro-vascular bundles of a dicotyledon. The last slide showed section of *Dipterocarpus alatus*, *Dipterocarpus pilosus* and *Shorea obtusa*. The *Dipterocarpæ* contain, as do nearly all seeds, a considerable amount of reserve material of a non-nitrogenous nature. In the cases of certain plants, such as the *Gramineæ*, the reserve material is practically always starch; in other plants, such as the *Brassica* and the olive family, it is nearly always oil, and in other families it is either starch or oil. It is thus in the *Dipterocarpæ*. From one variety a very important solid fat is obtained, which is largely used by the natives for making candles.—Brit. and Col. Drug., 1894, 606.

Dipterocarpus Zeylanicus, Thwaites (Hora).—A lofty tree, young branches compressed and glabrous, flowers in a raceme, petals blood-red with pale yellow margins; fruit, a nut densely canescent. The resin is used in the devil ceremonies, and the leaves and bark to reduce the swelling of the joints of cattle caused by overwork.—H. Kraemer in Materia Medica of Ceylon, in Proc. N. C. Pharm. Assoc., 1894.

EUPHORBIACEÆ.

Cultivation of Castor Oil Seed.—Davenport (Amer. Drug. and Pharm. Rec., 1895, 350) gives the results of experiments made in Georgia. The author distributed seeds of the castor bean among the farmers with instructions as to planting and cultivation. Many had their plants killed by frost, but several were very successful. One farmer was so successful that he has gone extensively into the business of planting castor beans for the market. The cultivation is simple and the returns are large. The beans are in demand at $1.25 a bushel, and pay better than cotton or corn. A sample of the product was sent to the Botanical Department at Washington, and the superintendent replied that he had never seen a finer sample anywhere. Instead of drawing from the land, the beans proved a great benefit to it by increasing its fertility, the heavy foliage of the plant acting as a fertilizer. Mr. Davenport's conclusion was that the cultivation of the castor bean could easily be made a very profitable industry in Southwest Georgia.

Kamala.—A. G. Perkin is continuing his work on the study of the rottlerin, the principal crystalline constituent of kamala. In a former communication (See Proc. A. Ph. A., 1893) he mentioned that in the treatment with nitric acid, rottlerin yielded small quantities of three colorless acids which did not contain nitrogen. He now finds that all three contain nitrogen. The analytical results of the former communication have been confirmed and several are again utilized in this paper.—Jour. Chem. Soc., 1894, 230.

A New Adulteration of Kamala.—Focke calls attention to an adulteration of kamala which has not hitherto been commented on. It consists of small violet colored translucent, more or less oval grains, which were determined by Tschirch to be a starch from some scitameaceous plant which had been roasted and colored with fuchsin. The adulterant was apparently added by the Chinese.—Apoth. Zeit., 1895, 15.

Latex of the Lac Tree of Tonkin.—According to G. Bertrand, the vapors given off by this latex produce erysipelic ulcerations of the skin. He has isolated a special diastase from the original substance, which he names *laccase.* From the alcoholic solution after separation of the gum and laccase, he also obtained a volatile oily substance *laccol.* The latter approximates to the polyatomic phenols. Laccase appears to be an oxidizing diastase.—Bull. Soc. Chim., (Paris), 1894, 14.

FUNGI.

Kefir.—H. Eberhardt (Pharm. Centralh., 1894, 620) publishes the following method of preparing kefir: Add to a liter of boiled and again cooled milk 20 to 25 Gms. of fresh buttermilk; to this add 10 to 12.5 Gms. of milk-sugar, and allow this mixture to stand in a well-corked bottle for 24 hours at 15–20° C. Agitate every 1½ or 2 hours. The bottles should be kept in a horizontal position. Kefir prepared in this way keeps 6 to 8 days.

Ergot of Molinia Coerulea, Mönch.—C. Hartwich describes the sclerotium of Molinia coerula as being like Claviceps purpurea of a bluish-black color, and likewise the same horny and irregular surface. It is 1.5 Cm. long and 2.0 Mm. thick. Upon a cross-section the rind is dark brown, and upon the inside of the hyphæ are numerous oil drops. The powdered sclerotium yielded with petroleum ether 31.45 per cent. of a fatty oil, which is at first colorless but then becomes yellow. He also obtained 0.8101 per cent. of a crystalline alkaloid. (The largest amount of alkaloid by Keller's alkaloid method was 0.245 in the Russian ergot; 0.095 in the Swiss; and 0.225 in the Austrian ergot)—showing that there is more than 3 times as much in Molinia coerula. The alkaloid is identical with cornutine.—Schweiz. Wochenschr. f. Chemie und Pharm., 1895, 13.

Fungi.—H. Kraemer makes the following classification of the fungi of the carposporeæ:

CARPOSPOREÆ.

Group.	Sub-Group.
I. Basidiomycetes: produce *basidia* containing *basidiospores.*	(1) *Gasteromycetes*—Spores produced in closed cavities; e. g., *bovista, phallus.* (2) *Hymenomycetes*—Spores not produced in closed cavities; e. g., *hydnum, polyporus.* (3) *Tremellineæ*—Jelly-like mass; fruit scattered on the surface; e. g.. *tremelline.*
II. Ascomycetes; produce an *asci*, in which *ascopores* are contained.	(1) *Discomycetes*—Fruit a cup-shaped body—*apothecium:* e. g., *morchellus, peziza.* (2) *Pyrenomycetes*—Fruit body—*perithecium*—of various shapes, but nearly closed, so that spores are inside; e. g., *claviceps.* (3) *Perisporeaceæ*—Fruit body remains closed until it decays; e. g., *erysiphe.*

—Amer. Jour. Pharm., 1895, 425.

Presence of Chitine in the Cellular Tissues of Mushrooms.—E. Gilson has obtained pure chitine from Agaricus campestris, and has also shown its presence in ten other species of mushrooms.—Compt. Rend., Vol. cxx., No. 18.

Fungus Cellulose.—E. Winterstein.—E. Gilson has described a nitrogenous substance mycorine, $C_{14}H_{28}N_2O_{10}$, which he has separated from the cell membrane of fungi. The present communication urges a claim of priority, the author being the first to point out the presence of nitrogen compounds mixed with the cellulose of fungi. From the results of his analysis, he doubts whether it is a single substance.—Zeit. f. physiol. Chem., 1894, 342.

Nitrogenous Compound Prepared from "Fungus-cellulose."—E. Winterstein has already shown that the cellulose obtained from various fungi contains a considerable quantity of nitrogenous constituents which are not of a proteid nature. Further investigation has shown that when the fungus-cellulose is heated with hydrochloric acid, it yields glucosamine hydrochloride, identical with the product obtained in a similar manner from chitine. Whether the constituent which gives rise to the formation of glucosamine is identical with chitine has not yet been ascertained.—Ber. d. Chem. Ges., 1894, 3113.

Nitrogenous Decomposition Product of Fungus Cellulose—A Correction.—E. Winterstein.—In his previous paper on this subject, it was stated that Boletus edulis, Agaricus campestris. and Morchella esculenta, when fused with potassium hydroxide at 180°, yield nitrogenous fungus cellulose; the substance cannot, however, be unaltered cellulose, as it is soluble in highly dilute hydrochloric acid.—Ber. d. Chem. Ges., 1894, 3508.

Constituents of the Tissue of Fungi.—E. Winterstein.—In this research, numerous members of the fungus group were investigated by methods sim-

ilar to those employed by E. Schulze. The chief constituent is undoubtedly a substance which resembles cellulose, and in some of its properties the true cellulose of Schulze; hemi cellulose appears to be present, and can be extracted by means of hot dilute acids. The fungus-cellulose ("Pilzcellulose") of de Barry is a mixture of cellulose with some nitrogenous substance, which, however, is not proteid in nature. Full references are given to previous work on the subject.—Zeit. f. physiol Chem., 1894, 521.

Trehalose of Mushrooms, with reference to a Paper by Winterstein.—Em. Bourqualot.—Winterstein declared that during the dessiccation of mushrooms, or even on keeping the recent heads, the trehalose, if present, totally disappears. Bourqualot shows in reply that three species retain trehalose after desiccation.—Bull. Soc. Chim., Vols. xi–xii, No. 8.

Composition and Analysis of Yeast.—P. Guichard gives a summary of analyses of yeast made by various chemists.—Bull. Soc. Chim., 1894, 230; Jour Chem. Soc., 1894, 404.

Behavior of Various Sugars towards Pure Yeast Cultures.—E. Fischer and H. Thierfelder.—No systematic attempt has hitherto been made to study the behavior of synthetical sugars towards pure cultures of yeast. The authors following this line of investigation have also reopened the study of a few natural sugars, employing in their experiments twelve varieties of yeast.—Ber. d. Chem. Ges., 1894, 2031.

Fermentative Function of Yeast Cells.—A. J. Brown shows that yeast cells can use oxygen in the manner of ordinary aerobic fungi, and says that they probably require it in for the full completion of their life history.—Jour. Chim. Soc., 1894, 911.

Yeast-gum.—E. Salkowski refers to the paper published by Hessenland, in the Zeit. Vereins Rübenzuck-Ind., 1892, 671. Hessenland finds that the composition of yeast-gum is expressed by the formula $C_6H_{10}O_5$, whereas, according to the author, it is $C_{12}H_{22}O_{11}$ (substance dried at 110°).

Hessenland finds that on hydrolysis, d-mannose, accompanied by a little dextrose, is formed. The author considers that this seems to show that yeast-gum, at all events when prepared by the process used by Hessenland, is a mixture of compounds.—Ber. d. Chem. Ges., 1894, 925.

Estimation of Starch in Compressed Yeast.—F. Filsinger.—20 to 30 Gms. of the sample is rubbed with 250 C.c. of water, and mixed with excess of a solution of iodine in potassium iodide; the starch combines with the iodine, and forms a comparatively heavy compound, which settles long before any appreciable quantity of yeast has gone down. The milky liquid is siphoned off, and the iodide of starch repeatedly lixiviated with water until all the yeast cells have been removed. The starch is finally collected on a weighed filter, dried at 105°, and weighed. The iodine is practically expelled during the heating. In calculating the percentage, it must be remembered that commercial potato starch generally contains 15 per cent.

of water. The test analyses are very satisfactory. When, however, the amount of starch is below 10 per cent. the results will be somewhat too low.—Chem. Zeit., 1894, 742.

Fungus and Diastaste.—J. Takamine has discovered a novel method of preparing diastase and some other substances. He has been cultivating *Eurotium oryzæ*, a mycelial plant of the *Aspergillus* family, on wheat-bran, and has found that at an early stage of its growth it bears upon its roots minute crystals of diastase, while the unripe spores contain a very powerful ferment. By washing the bran in percolators and crystallizing the solution, he claims to be able to obtain diastase of considerable purity as a commercial product. Takamine claims that a mixture of equal parts of this diastase (or "Taka-koji," as he calls it) and crude wheat-bran, when added in the proportion of 10 per cent. to the quantity of grain mashed, will effect a more perfect conversion than the use of 10 per cent. of the best malt. The ferment is a very remarkable substance. It is said to be three times as powerful as yeast—that is, it will continue to produce fermentation in a sugar solution till there is 20 per cent. of alcohol present, whereas the action of ordinary yeast stops when the percentage of alcohol reaches 7. This one fungus, therefore, appears to produce in itself the converting agents required in two of the most important processes in the manufacture of beer and spirits. Besides this, the wheat-bran, after two or three cultivations have been grown upon it, is said to form a good food for cattle, containing some 20 per cent. of protein, or flesh-forming substance.—Brit. and Col. Drug., 1894, 625.

GERANIACEÆ.

Geranium maculatum.—E. S. Bastin describes the starch grains as smooth, mostly long, ovate in outline, with the hilum located near the larger end. The hilum is occasionally fissured, but is usually not so. The grains are very seldom double, but sometimes binucleated. About the hilum are a series of curves, those nearest it circular and concentric with it, while those farther away were elliptical and eccentric.—Amer. Jour. Pharm., 1894, 522.

GNETACEÆ.

Gnetum.—W. Elborne calls attention to the Gnetum as possessing internally the remarkable winged structure characteristic of the Menispermaceæ. Also that while "Abuta" and "Butna" are popular Brazilian terms for Pareira brava (Chondodendron, Ruizet Pavon) and Abuta, Aubl., likewise an allied genus (Menispermaceæ), yet its genus Abutna, Lour., is synonymous with Gnetum, L.—Pharm. Jour. Trans., 1894, 139.

GOODENIACEÆ.

Scævola Koenigii.—Boorsma finds the bark of this to contain an indifferent bitter principle apparantly void of toxic action.—Pharm. Zeit., 1895, 339.

GUTTIFERÆ.

Garcinia Indica Chois.—The acrid fruit husk and seeds are considered valuable in India. The seeds yield the so-called "Kokam" butter, which is used by the natives as a food, but is used by the Europeans externally. —Pharm. Post, 1894, 531.

HAMAMELIDEÆ.

American Storax.—K. Mohr describes, as an eye witness, the collection of American storax from the sweet gum trees (Liquidambar styraciflua) in the Mississippi States. The trees are completely ringed by a cut penetrating deep into the sapwood. The resin exudes from the wood, and hardens to clear colorless drops. Occasionally cavities filled with resin are formed in the bark. He describes it as a white product seldom marked with brownish or yellowish streaks. It is generally of the consistency of tolu-balsam, becoming softer at a higher temperature. The fracture is conchoidal and lustre bright. At 50° C. it melts to a clear yellow liquid. The odor is amber-like, taste aromatic and slightly burning. An alcoholic solution is used in asthma troubles, and an ointment is made and employed by the people.—Pharm. Rund., 1895, 57.

INDEÆ.

Stamens in Saffron.—F. Ranwey directs attention to the adulteration of saffron by the addition of the stamens from the same flower. Their detection is easy when the saffron is whole, for though the stamens are yellow like the styles, the stigmas are red and usually attached to the styles, and in addition the form of each part is very characteristic. In powdered samples, however, detection of the adulteration is not so simple. When stamens are present to any extent the reddish tint of the powder is of course diminished, but there is no principle in the stamens that can aid in their detection by chemical means. It is necessary to depend upon the anatomical structure, which is completely different in the male and female organs of the flower. The inner surface of the anther is formed of a layer of large cells, the walls of which are thickened by characteristic spiral bands. Such bands occur in nearly all stamens, but their form and size vary with the species of plant. Again, though saffron normally contains a little pollen, when stamens are present the proportion is greatly increased.—Ann. de Pharm., i. 6: Pharm. Jour. Trans., 1895, 644.

JASMINACEÆ.

Jasminum glabriusculum—Boorsma isolated, from the leaves of this, a brownish yellow, amorphous bitter principle.—Pharm Zeit., 1895, 339.

LABIATÆ.

Peppermint Crop in U. S.—The American Agriculturist (1894), says that the peppermint crop of the United States, "though confined to a few localities with a very small acreage compared with other crops, is neverthe-

less an important one to many farmers in New York State and portions of Michigan and Indiana. Reports indicate that the 1894 crop just harvested has been secured in good condition. In New York the acreage shows a fair increase and the yield per acre is better. Preliminary estimates, subject to modification upon the receipt of further individual reports, point to an acreage in Northern New York of about 3,000 acres against 2,300 last year, producing approximately 64,000 lbs. of oil compared with 42,000 lbs. in 1893. Relatively little oil has yet left producers' hands, and many growers are holding for higher prices. In Michigan and Northern Indiana the acreage is perhaps 12,000 acres, according to initial reports received.

LAURINEÆ.

Walnut-shells in Ground Cinnamon.—B. Dyer and J. F. H. Gilbard have made a chemical examination of ground walnut shells and ground cinnamon shells, with the following results:

	Average of five samples of chips and quills.	Ground Walnut shells.
Moisture (loss at 100° C.)	12.41	9.97
Approximate volatile essential oil	1.57	0.27
Fixed ether extract	2.14	1.60
Alcoholic extract after ether	12.57	3.67
Total ash, less sand	4.22	0.87
Ash soluble in water	0.46	0.37
Ash insoluble in water	2.76	0.50
Fibre	34.25	47.67
Nitrogen	0.51	0.20

The items "volatile oil," "alcoholic extract," "insoluble ash" and "nitrogen," would all be of assistance in calculating the percentages in a mixture of ground cinnamon and walnut-shells. The authors also state that the stone cells of the two are quite different.—Chem. Drug., 1895, 867.

Powdered Cinnamon.—Pfister observes that of late years the quality of the lower grades of cinnamon bark and of powdered cinnamon, which is largely produced from the broken bark and siftings of such grades, has been very low. An attempt at improvement has recently been made by adding to such cinnamon the stalks of cassia buds, which possess an unusually powerful odor of cinnamon. In the powdered drug such an admixture can be recognized by the small conical thick-walled hairs, long sclerenchymatous cells with large lumen, and the small spiral vessels. Pfister considers that such addition of cassia stalks to powdered cinnamon is admissible, inasmuch as by the comparatively large proportion of volatile oil they contain, they tend to raise rather than lower the quality of the powdered drug.—Forschungs Berichte, i, 540, through Pharm. Jour. Trans.

Tetranthera laurifolia, Jacq.—The bark, known in India as Maida lakri, is used by the natives in diarrhœa and dysentery.—Pharm. Post., 1894, 531.

Queensland Sassafras.—J. Lauterer, in a paper on "The Sassafras Tree of Queensland," states that there are three kinds—Darphora Sassafras, Nesodaphne obtusifolia, and Cinnamomum Oliveri, Bail. The last has been mistaken for Nesodaphne obtusifolia, until recently Bailey had found it to be a new species of Cinnamomum. Under the name Nesodaphne it has been investigated by Staiger, Maiden, and by the late Dr. Bancroft, who used it extensively in his practice. The so-called sassafras tree contains one-half of 1 per cent. of camphor (identical with the camphor of the East Asiatic laurel-camphor). The essential oil percentage is too small to repay distillation.—Chem. and Drug., 1895, 529.

LEGUMINOSÆ.

Differentiation of Catechu.—To differentiate the two varieties of catechu admitted to the late German Arzneibuch, to wit, Pegu, or acacia catechu, and Gambir (from Uncaria gambir), the microscope is used, the anatomical elements present in the extracts being the subjects of differentiation. Gambir is obtained from the young leaf and flower-bearing stems, while catechu is the product of the body-wood of the plant. The extract is dissolved (according to Gehe & Co.), either by some alkali or by a 30 per cent. solution of acetic acid, and the insoluble residue is the part examined under the microscope. According to Cæsar & Lorenz, the clearer sort of gambir, rubbed up with glycerin and examined under an amplification of 200 diameters, appears crystalline, while the darker sorts show this peculiarity only under the use of the polarizing apparatus.—Pharm. Centralh., 1894, 536.

Chrysarobin.—Andouard gives, in the Nouveaux Elements de Pharmacie, an excellent account of the differences which are chiefly noticed between this body and chrysophanic acid. The German Pharmacopœia (1890) indicates as chrysorobin a body with the following characters: "A crystalline powder, yellow and very light; boiled with 2,000 parts of water, it does not dissolve altogether, but gives a yellowish solution, giving no reaction with litmus or ferric chloride. Solution of ammonia, in contact with chrysarobin for a few days, becomes of a carmine color. One milligramme of the substance treated with a drop of fuming HNO_3 gives a red color, becoming violet with ammonia. It dissolves in 150 parts of boiling alcohol; in warm chloroform, and in CS_2. Chrysophanic acid, when pure, on the other hand, occurs in yellow clinorhombic prisms, melting at 162°, insoluble in water, soluble in 224 parts of boiling alcohol. A characteristic reaction is the addition of a few drops of H_2SO_4, when a red tint is found, which turns blue on the addition of KOH.—Journal de Pharmacie d'Anvers; Brit. and Col. Drug., 1894, 211.

Tests for Copaiba.—The principal adulterant is gurjun balsam (E. I. wood oil), and among others are mineral oil, castor oil, etc. Gurjun balsam can readily be detected by holding the suspected sample in the sun or a strong light; the presence of gurjun balsam is indicated by a greenish-violet tinge. Hager's test is as follows: To 4 c.c. of a mixture of 1 part pure sulphuric acid and 25 parts pure acetic ether, add 4 drops of the balsam to be tested; after a few minutes the mixture will assume a violet hue if a large percentage of gurjun balsam be present. Smaller quantities are shown by the formation of a dark brown color after standing twelve hours. Paraffin oil, liquid paraffin, or vaselin oil, can be detected by the following test: Put 30 drops of the balsam in a test tube, adding three or four times their volume of 95 per cent. alcohol, shake well together, then hold the tube suspended in boiling water until the contents begin to boil; if paraffin oil is present, it will appear separated from the mixture at the bottom of the vial, the balsam being held in a clear or milky solution by the alcohol. To detect castor oil, heat 10 grains of the balsam in a silver capsule with an equal quantity of soda. If, after frothing ceases, an odor of capryl alcohol is perceived, the presence of castor oil is certain. If the balsam is further warmed with 50 C.c. of water, filtered, the filtrate heated with an excess of nitric acid, and filtered, while still hot, a white precipitate of sebacic acid will subside on cooling, if the supposed admixture was present. Pure balsam copaiba of all varieties, excepting Pará, mixed with an equal volume of aqua ammoniæ, will make a clear transparent solution, and will more readily do so when heated. If gurjun balsam, Venice turpentine, or castor oil is present in the copaiba, the mixture, after standing for, say, twelve hours, will remain either wholly or partly cloudy. It is necessary to take ammonia-water, the same results not being obtained with stronger ammonia. Owing to the large percentage of oil which is present in Pará balsam, the above test is not applicable to this variety.—Chem. Drug., 1894, 740.

Euchestria Horsfeldii.—Boorsma finds the seeds of this to contain a toxic alkaloid.—Pharm. Zeit., 1895, 449.

Anatolian Liquorice Root.—J. W. Nickham subjected it to the action of various solvents with the following results:

Petroleum ether extract	0.54	per cent.
Ether extract	4.07	"
Absolute alcohol extract	6.64	"
Water extract	10.34	"
Alkaline water extract	1.14	"
Acidulated water extract	0.52	"

The author failed to find tannin in the bark of liquorice root. Moisture was 7.58 per cent.; and ash, 8.84 per cent.—Amer. Jour. Pharm., 1895, 306.

Cultivation of Liquorice in the U. S.—H. G. Rittenhouse (Ibid., 72) says that the 80,000,000 pounds of liquorice root annually imported into this

country is of the wild variety. Italy and Spain supply probably 5 to 8 per cent., while Southern Russia supplies two-thirds of the remainder, and Asia Minor and Syria the other third. After describing the digging of the fresh root, its drying, curing, pressing and baling, and transportation, etc., with all the attendant costs, Rittenhouse expresses the belief that, despite the cheapness of Asiatic and Russian labor, it would be perfectly feasible and profitable to grow liquorice root in this country. He has at present a number of plants growing in several places in New Jersey, Pennsylvania, Louisiana and Florida.

Testing Balsam of Peru.—Gehe & Co. have found the determination of the percentage of cinnamein and the saponification number a valuable method in testing this article. A series of experiments on some fifty samples show that in genuine balsams the proportion of cinnamein lies between 57 and 60 per cent., the saponification equivalent being from 235 to 238. If a balsam shows results differing from these figures it can be pronounced as adulterated with certainty; if the saponification number is right and the proportion of cinnamein too low, the sample is at least of inferior quality. The test is applied thus: About 5 Gms. of the balsam is shaken with 5 Gms. of water and an equal quantity of official solution of soda. The cinnamein is then extracted by washing with three successive 10 Gms. of ether. The ether is evaporated on a water bath, and the cinnamein weighed. The ether takes some time to volatilize, it is therefore necessary to make successive weighings, the final one being taken when the loss is not more than 1 Cgm. in five minutes. To the weighed residue 35 to 40 C.c. of semi-normal alcoholic potash solution is added, and about 20 C.c. of alcohol; this mixture is saponified on the water-bath, and the amount of uncombined alkali determined by means of semi-normal acid solution.—Pharm. Centralh. 1895, 241.

Peru Balsam.—F. Mussel examined 10 samples from San Salvador and obtained results in ranging in specific gravity between 1.144 and 1.150; insoluble in benzin, 31.26 to 39.17; soluble in benzin, 60.83 to 68.74; the specific gravity of the ether was uniformly 1.106; insoluble in alcohol, 4.5 to 6.4.—Pharm. Centralh., 1895, 76.

Peru Balsam and Fatty Oils.—To mix Peru balsam with fatty oils, first rub the balsam with half its weight of castor oil.—Oesterr. Zeitschr. f. Pharm., 1895, 386.

Tolu Balsam.—P. Oberländer has subjected balsam of tolu to chemical examinations, and finds the resinous portion to consist of tolu-resinotannol in combination with cinnamic and benzoic acids, the latter in small proportions only. In addition the balsam contains 7.5 per cent. of an acid, aromatic, oily liquid, principally benzyl benzoates, with a little benzyl cinnamate and .05 per cent. vanillin. Neither styracin, free benzyl alcohol, or phenyl-propyl cinnamate, could be detected. The balsam is

a pathological product, and in this respect, as well as in its chemical composition, resembles balsam of Peru. The lamina of the leaf of the Toluifera balsamum L. contains schizogenous ducts just on the boundary between palisade and spongy parenchyma, and in the midrib. Small twigs exhibit a number of such ducts, but during the secondary growth they are completely thrown off and no new ones formed. The bark of older stems, which is entirely free from schizogenous ducts, was found to contain phloroglucin, tannin, phlobaphene, traces of wax, sugar, and cumarin, but none of the constituents of the balsam.—Archiv. der. Pharm., 1894, 599.

Gum Arabic Testing.—Add 3 C.c. of a solution consisting of 15 drops Liquor Ferri Chloridi; 15 drops of a saturated solution of potasium ferrocyanide; 5 drops of HCl (1.125) and 60 C.c. of water, to 20 per cent solution of the gum. If the gum arabic is pure, it will remain a clear yellow for 8 to 10 hours. If there is dextrin present, the color changes to a blue. —Pharm. Post., 1894, 563.

Gum Chicle—Fr. Hoffman says that the Chicle which reaches the United States principally from the Mexican ports of export, is said to be derived from the *Prosopis glandulosa*, Torrey (Mimoseæ). From all appearances, neither chicle nor balata are capable of serving as substitutes for gutta-percha. The gum chicle now in the market is purer, better and cheaper than formerly. It is employed in the United States in the manufacture of chewing-gum.—Pharm. Runds., 1894, 184.

Composition of Soluble Gums.—Martina studied 27 varieties of gum, and the following table represents the composition of some of the principal ones. The pentaglucose was determined from the furfurol—furfurol : pentaglucose = 0.5 : 1; and the galactose was determined from the mucic acid—mucic acid : galactose = 0.75 : 1.

Origin.	Source.	Ash.	Lime.	Mucic acid.	Galactose.	Furfurol.	Pentaglucose.	Total glucoses.
Gum Arabic....	Arabia	3.60	1.84	22.98	30.66	13.57	27.14	58.3
	Senegal. ...	3.25	0.90	19.72	26.29	12.97	25.94	57.58
	Gezireh....	2.75	0.94	12.42	17.89	19.32	36.62	60.66
	Aden.	3.70	1.33	18.68	24.90	15.26	30.52	56.90
	Mogador ..	3.50	0.78	18.10	24.13	13.90	27.80	50.31
	N. Holland.	0.50	—	45.82	61.09	10.85	21.70	43.75
	Indies.	4.16	0.97	14.75	19.66	17.98	35.96	56.52
Mimosa nilotica.	Egypt.....	2.80	1.36	5.91	7.88	21.44	42.88	49.13
Acacia dealbata.	Van Diémen	0.65	—	39.09	52.12	8.89	17.68	73.93
Acacia angico...	Brazil.....	2.89	—	1.23	1.63	40.35	80.70	74.22
Gum of Apricot.		4.20	1.85	9.16	12.21	17.27	34.52	43.48
Gum of Plum...		2.15	1.07	5.19	6.92	31.03	62.06	66 47
Gum of Cherry..		2.50	1.00	6.13	8.17	23.07	46.14	56.38

—L'Orosi, 1894, fasc. 1; Apoth. Zeit., 1894, 295; Jour. Pharm. Chim., 1894, 24.

LICHENÆ.

Irish Moss.—T. S. Wiegand (Amer. Jour. Pharm., 1895, 596) says the town of Jerico, Mass., seems to be the centre of this industry. Boys, men and women all engage in the work, which consists in spreading it upon the beach, prepared by raking all the dirt, stones and driftwood away, and leaving a fine bed of white sand; when the weed is first brought in by the boats, each of which gets about a barrel and a half, it is taken upon creels, a sort of barrow, and spread out upon the beach; it is turned over daily as in hay-making, for the space of two weeks; each morning it is washed in clean sea-water (fresh water ruins it); it is then gradually bleached, as when first gathered it is of a light-green color, and in the course of a few weeks becomes successively red, pink, and finally nearly white.

Stormy weather is a great drawback to the mosser's work. Some of the moss that the storms tear loose and scatter upon the rocks is gathered and classed as hand-picked, bringing generally a quarter or one-half cent per pound more than that gathered in the usual way for commerce.

Should a spell of rainy weather come on during the season of gathering, heavy unbleached muslin covers are used to protect the moss, which is packed up in heaps.

Two crops are obtained each year, the first one being the better; the late crop is liable to be injured by a little black vegetable growth called glut, caused, it is said, by the warmer water of August days.

LILIACEÆ.

Sugar of Agave.—In 1892 Michaud and Tristan claimed to have separated from the sap of agave americana a new sugar with the formula $C_{12}H_{22}O_{11}$, to which they gave the name agavose, differing from all others of the same group, except synanthrose, by its inactivity. From a careful series of experiments, W. E. Stone and D. Lot now state their conclusion that this sugar has been erroneously described as having distinct properties, and that it is identical with sucrose.—Amer. Chem. Jour., May, 1895; Pharm. Jour. Trans., 1895, 1176.

Curacao Aloes.—Kremel gives a method to distinguish curacao aloes from other kinds by adding to it a little cupric sulphate solution, then some saturated solution of common salt, which makes the color an intense carmine. The reaction is due to cupro-alvin.—Chem. Drug., 1895, 759.

Veratrum Viride.—E. S. Bastin considers this rhizome and its minute structure, and states that he has observed in one instance the fraudulent substitution of the rhizome and rootlets of Simplocarpus fœtidus for those of veratrum viride. They are larger generally than the latter, have a thicker cortex and smaller starch grains, as well as a characteristic fœtid odor.—Amer. Jour. Phar., 1895, 196.

LINEÆ.

Methyl-Salicylate from Coca Leaves.—M. P. Romburgh has detected methyl-salicylate in the distillate from coca leaves. It appears to exist pre-formed in the leaves, but only in very small quantity, varying from 0.004 per cent. in erythroxylon bolivianum to 0.13 in very young leaves.—Rec. des. tran. Chim.; Chem. Zeit., (Rep.) 1895, 130.

Commercial Linseeds.—A. J. Dey and W. B. Cowie examined a number of commercial specimens, and state that the minimum amount of ash in linseed meal should be 5 per cent. and that the oil ranges from 34 to 40 per cent. The South American and Bombay seeds are large sized, of excellent quality, very free from foreign seeds, highly farinaceous, and yielded a high percentage of oil.—Pharm. Jour. Trans., 1895, 1037.

Flaxseed Meal Poultices.—R. W. Lovett concludes from experiments that flaxseed-seed meal poultice is a dressing often sterile, and if not sterile contains, as a rule, organisms which are probably not pathogenic, but it may contain pus cocci. It is added that no care in its pregaration can be relied on to make it sterile.—Boston Med. Surg. Jour.; Drug. Circ., 1895, 112.

LOGANACEÆ.

Strychnos Ignatia.—F. Ransom shows that although the seeds of S. ignatia contain a larger proportion of strychnine as compared with brucine, than those of nux vomica, the percentage of total alkaloids is considerably less.—Pharm. Jour. Trans., 1894, 139.

MALVACEÆ.

Abutilon Indicum.—The seed known as Balbij is valued for its mucilaginous and diuretic properties.—Pharm. Post, 1894, 531.

MYRICACEÆ.

Myrica sapida, Wall.—The rind, known in India as Kaiphal, is used as a stimulant in catarrh and pulmonary troubles.—Pharm. Post., 1894, 531.

MYRISTICACEÆ.

Myristica malabarica, Lamk.—The seeds and the arillus are used in India. The former yields an oil which is used in the form of embrocation and the arillus is used in Bombay as a spice.—Pharm. Post, 1894, 531.

NYMPHACEÆ.

Nelumbium speciosium.—The seeds, known in India as Kanval, are used in China and India as a favorite food.—Pharm. Post., 1894, 531.

OLEACEÆ.

Grains de Coula.—H. Lecomte and A. Hérbert (Jour. Pharm. Chim., 1895, 322) say that the fruit of this tree is a small edible nut of the flavor

of rye bread, and that they contain 28 per cent. of a fatty oil, consisting almost of pure triolein. The same authors describe the "Grains de Moabi" of the Congo as containing 30–35 per cent. fat, which is probably a mixture of myricin, palmatin and stearin.

Basaracantha spinosa, var. ferox, Schum.—B. Grötzner has continued the examination of T. Peckolt, and finds the crystalline principle in the bark and leaves to be mannit.—Arch. der Pharm., 1895, 1.

Australian Manna.—According to F. A. Flückiger, the Myoporum manna is much less pleasing to the eye than the best sorts of Sicily manna, and is of a predominant feeble-gray color, being in some places white and throughout crystalline. The odor and taste remind one of the Ash manna. With 10 parts of water Myoporum manna yields a brownish neutral solution, which is but little decolorized by animal charcoal treatment. Lead acetate gives a hardly perceptible precipitate. Upon standing over H_2SO_4 for 2 days it lost in weight 2.6 per cent. It is unaltered by the air. From the watery solution mannit crystallizes. By means of alkaline copper sulphate 3.79 per cent. of glucose were found. In a polariscope a 10 per cent. showed scarcely a dextro-rotatory effect. It yielded 0.5 per cent. of ash.—Archiv. der Pharm., 1894, 311.

PALMEÆ.

Uses of Carnauba Palm.—Some idea of the economic value of the Carnauba palm may be obtained from the statement that the following products from that tree were exported from Aracaty, Ceará (Brazil), during the first half of 1894: 443,500 hats, 73,360 mats (*esteiras*), 120,000 brooms, 20,000 pieces of cordage, 119,612 Kgm. of wax, 14,140 Kgm. of candles, 62,900 Kgm. of fruit stones, 2,000 *capachos* and 111 *ripas*. The Carnauba palm is one of the most useful trees of the interior, for it furnishes food, clothing, shelter, cordage, wax, thread for nets, fencing, etc. —Amer. Drug. and Pharm. Rec., 1894.

PAPAVERACEÆ.

Argemone Mexicana, L.—The seeds known as Darwu yield an oil that is valued as an aperient in dysentery and other troubles of the intestinal tract and may possibly be used as a substitute for castor oil.—Pharm. Post, 1894, 531.

History of Opium.—A. H. Cupit (Pharm. Era, 1894, 364) says it was known to Theophrastus in the third century, B. C., Scribonius Largus, in his "Compositiones Medicamentorum," about 40 A. D., mentions the method of procuring opium, and points out that the true drug is derived from the capsules, and not from the foliage of the plant. Dioscorides, about A. D. 77, describes exactly how the capsules should be incised, showing that opium was, at that early period, a branch of industry in Asia Minor. Pliny and Celsus also refer to the drug, the latter mentioning it

as "Lacrima papaveris." The Arabs are credited with having carried opium to the Eastern nations, first of all to the Persians. The introduction of opium into India seems to have been connected with the spread of Islamism. Kämpfer, the great German traveler, who visited Persia in 1685, describes the various kinds of opium and methods of preparation. The best kinds were flavored with spices, or saffron, or ambergris, and were given the name of Theriaka. Toward the sixteenth century the commercial value of this drug waned considerably, and we find it quoted at much the same prices as gum benzoin, and much cheaper than camphor, rhubarb, and manna. The author then described how opium is produced, dealing also with the exports from Smyrna, and the manufacture of fictitious opium. Finally, he discusses the opium question as it affects China, and the various political upheavals which have resulted from it.

Opium Yield.—Counting only on a maximum yield of 4,000 couffes for the whole of Turkey, there is estimated to be—taking into account the existing stock of about 6,000 cases in the interior of the vilayet of Aidin, at Smyrna, Salonica, Constantinople, London, New York and Philadelphia—a total of 10,000 couffes, which is amply sufficient for pharmaceutical and special consumption for a year and a half, this consumption never having in a year been more than 5,500 cases on the average. It should also be noted that Persian opium is plentiful on the consuming markets. When the prices of Turkish opium exceed a certain limit, which is the case in London at the present time, then Persian opium is sold in preference to that of the Ottoman Empire. If the forthcoming crop should be a good one, the total production of Turkey can easily reach 8,000 couffes, which will bring the quantity available for consumption in the coming year 1895–96, to the very respectable figure of 14,000 couffes. It is this large quantity at disposal which explains the little trouble taken by exporters to follow the speculation which has been manifested recently on the Smyrna exchange.—Foreign and Colonial Importer; Canad. Drug., 1895, 141.

Opium from Rare Sources.—E. Dieterich reports more than 100 analyses upon the opium collection of the world from the Pharmacological Institute of Vienna. The analyses contain the per cent. of moisture, morphine, narcotine, meconic acid and starch, and, whenever possible, the amount produced in ockas in 1882, and the price per ocka in gold.—Pharm. Centralh., 1894, 584.

Artificial Opium.—F. Stephenson (Chem. and Drug., 1895, 124), says the process employed in preparing false opium in India is as follows (the original directions):

Aloes (in fine powder)	8 parts.
Root of canna indica (in fine powder)	1 part.
Datura seed (in fine powder)	2 parts.
Opium	1 to 2 parts.

Rub the opium to a paste with water, and add alternately in small portions the aloes and the canna and datura (the two latter previously mixed). Make the mass into a ball resembling opium, and bury it in 4 feet of ground in an earthen pot for 41 days, after which it is ready for use.

The flavor of the aloes is at first very strong, but the prolonged burying in the earth has the effect of blending the odors and subduing the too pronounced flavor of aloes.

This process yields a product which resembles opium very closely both in appearance and in flavor. The latter is, of course, due to the small proportion of opium present, which is necessary to add in order that the stuff might readily pass for the real drug. Of course, such an article would contain a small percentage of morphia. Hill informs the author that a specimen in the Pharm. Soc. museum has a distinct Socotrine aloes smell, and a faint bitter aloes taste, and suggests that aloes has been added in small quantity to impart a bitterness like morphia.—Compare Pharm. Jour. Trans., 1882, 514.

Sanguinaria Canadensis..—J. U. Lloyd writes that the reputed value of sanguinaria as an emmenagogue originated in the paper of Downy (1803) and from that (without corroborative testimony) has continued to the present day. The editor of Western Druggist records cases of use for producing abortion.—West. Drug., 1895, 222.

Structure of Sanguinaria Canadensis.—Bastin states in some further notes on the structure of this plant that the red or orange colored secretion found in the rhizome is chiefly contained in distinct cells, which are either isolated or connected into irregular chains and distributed among the parenchymatous tissues of the middle bark and large pith. In the inner portion of the middle bark, however, and in the inner bark, occur chains of cells, which are longer, more regular, and contain a yellow rather than an orange-red secretion. The cells composing the chains are also much narrower and more elongated than are the ordinary secretion cells. In most instances there is no apparent communication between the cells of these rows, the transverse partitions between the cells being imperforate. "In a few instances, however, particularly in the inner layer of the bark, there is demonstrable a connection between the secretion cells of the chains, which thus form a true laticiferous tissue, essentially like that occurring in many other of the Papaveraceæ, though, of course, much less complex in its development." The milk tubes are seldom more than a dozen cells long, and are seldom branching, the reticulate form of laticiferous tissue being found only in the most rudimentary stage of its development. The secretion cells contain resins as well as alkaloidal principles, and it seems probable that the salts of sanguinarine are more abundant in the large orange-red secretion cells of the pith and outer portion of the middle bark, while those of chelerythrine are more abundant in the smaller yellow

cells and laticiferous tubes of the inner bark and inner part of the middle bark.—Am. Jour. Pharm., 1895, 4.

PENDOSTEMACEÆ.

Pendostemaceæ of Brazil.—T. Peckolt considers *Mourera Weddeliana* Tul., an aquatic that is useful in connection with the cooking of fish, on account of the salt it contains. It is dried, incinerated and the salt obtained by solution in hot water; this is then strained. The salt obtained contains K_2SO_4, 2.18; K_2CO_3, 13.82; KCl, 33.6; NaCl, 50.4 per cent. *Aspinagra fucoides*, Tul. and *Lophogyne helicandra* Tul., are both found in water-falls, and the latter in the form of a decoction is useful as a refreshing drink in fever.—Pharm. Rund., 1894, 240.

Cubeb and its Adulteration.—Under the name of Piper cubeba var. crassipes, de Wevre describes a fruit that is 7 Mm. in diameter, 7 Mm. long, and a stem 11 to 15 Mm. long. It possesses the odor of mace and has a slight burning taste. H_2SO_4 gives it a brown color. It has scattered groups of stone cells and possesses a mesocarp of 8 to 10 rows of cells. The endocarp consists of two rows of polygonal cells.

In the powdered condition the iodine test for starch is important, as it distinguishes the true cubebs from the Rhamnus fruit. The cubebs of the Javanese districts, Bagelew, Cheribon and Djobjokarta possess shorter hairs, the cells of the mesocarp are of different lengths or broader, and the number of rows of cells varies.—Zeitschr. Oest. Apoth. Ver., 1895, 121.

Cubebs.—A. Nogl has examined a number of samples of genuine and false cubebs and has devised the following scheme of classification:

I. Rind composed of relatively large, more or less strongly marked and uniformly thickened sclerenchyma.
  A. These extend distinctly and radially and are:
    (a) In simple layers:
      1. With large lumen (Type I).
      2. Entirely (or nearly so) thickened (Type III).
    (b) The inner layer of the mesocarp is thickened in numerous layers by stone cells. (Type II and IV).
  B. Stone cells do not extend radially (or if so but slightly), but generally extend tangentially. (Padang Cubebs.)
II. The stone cells of the rind are either wanting (Carbauw berries of Java being false) or they are small and one-sided and near the thickened cells of the mesocarp.

In the subdivision A are included four types that belong to Piper cubeba. Padang cubebs have the appearance of true cubebs but differ as above.—Pharm. Post., 1894, 481.

Cubeba.—L. Emanuel (Amer. Jour. Pharm., 1894, 360).—Recently an Eastern firm sold powdered cubebs, the color of which was of a lighter shade than is usually met with. Upon examination it produced 18 per cent. of oleoresin of a brown color; this fact was brought to the notice of

the seller, who made the following reply: "The Pharmacopœia requires the unripe fruit, but that is rarely found in the market; the regular article of commerce is the ripe fruit, which, of course, has less chlorophyll or green color than the unripe berries should have. We consider the cubebs which we carry in stock of as prime quality as can be found in the market."

Kawa.—C. Prayser has obtained from the rhizome of *Piper methysticum*, from which the methysticin has been separated, a resinous product that is insoluble in water and ether, but soluble in alcohol and chloroform. It contains upon analysis: C, 68.57; H, 6.03; O, 25.40 per cent. Upon pouring the alcoholic solution of the resin into water he obtained a crystalline product of M. P. 148° C. All attempts to obtain an alkaloid were futile.—Pharm. Rund., 1894, 210.

Adulteration of Powdered Pepper.—D. Martelli applies the phloroglucin test for ligneous substances as follows: Digest 1 Gm. of phloroglucin with 60 C.c of HCl (sp. gr. 1.100) for one or two days. Then to this mixture, in a porcelain dish, he adds 0.5 Gm. of the pepper powder to be tested, and warms slowly. The whole mass assumes a cherry red color if ligneous substances are present; the pepper is yellowish or reddish-brown. The mixture is diluted with water, the solution decanted and the adulterated portion (reddish-violet colored) is easily discovered.—Stazperiment. agras. ital., 1895, 53; Chem. Zeit. (Rep.), 1895, 114.

Examination of Pepper—W. Busse has obtained from the epidermis and hypodermis of the husks of pepper a derivative of pyrogallol which he finds is not present in the inner fruit. This he obtains by means of an aqueous alkaline solution and obtains the pyrogallol derivative in the form of a lead salt. From this he calculates the amount of lead taken into combination with 1.0 Gm. of dried powdered pepper, and calls this the "Lead Figure." Upon examination of 12 black peppers powdered by himself, he obtained between 0.047 and 0.075; for two poor sorts of Penang pepper, it was between 0.116 and 0.112; for white pepper it gave 0.006 and 0.013, and for the husks, 0.027. The husks and fruit stems for Penang pepper gave 0.129 to 0.143.—Pharm. Centralh., 1895, 612.

Piper Clusii.—Herlant has contributed to the study of useful plants from the Congo territory, by examining the fruits known as "Poivre de Clusius." He finds that they contain 11.5 per cent. of volatile oil and 5 per cent. of piperin, either free or in the form of a compound which is decomposed by solvents. The detection and localization of the latter body can be best effected, according to the author, by the persistent yellow color it produces in contact with hydrate of chloral; it exists only in the albumin. In assaying it the solvent action of sodium salicylate was utilized to separate resinous matters; the amount of piperin thus determined proved to be less than is present in black pepper, but Herlant thinks they could be used

either as a source of piperin, or, if deprived of part of their volatile oil, as a condiment. Although its structure resembles that of cubebs, the fruit is to be classed with the peppers containing piperin.—Acad. Roy. de. Méd. de Belgique, 1894, 115, through Pharm. Jour. Trans.

Piper Ovatum.—H. Garnett (Brit. and Col. Drug., 1894, 649). This plant grows freely in Trinidad, and specimens of the leaves had been sent to Kew, with the statement that it was considered useful in hydrophobia, and as an antidote to snake bites. Dyer had suggested its examination, and had provided the material for study. The leaves were not unlike jaborandi, but on chewing them a tingling sensation was produced, with numbness and salivation. This latter peculiarity suggested a resemblance to pellitory.

In the chemical examination a resin was the principal constituent obtained. Attempts to purify this resin were for a long time unsuccessful. Fractional precipitation by water from the alcoholic solution gave only negative results. At last it was discovered that fractional precipitation of an ethereal solution by means of petroleum spirit yielded a crystalline substance. This body was obtained sufficiently pure to yield a definite melting point, 123° C., and crystallized in rosettes. It is soluble in alcohol, chloroform, ether, and acetone. The alcoholic solution gelatinizes when water is added. By combustion figures were obtained that agreed fairly with the formula $C_{16}H_{21}NO_2$, and hydrylosis gave piperidine, closely allied to piperine. The physiological action had been examined by Cash, who reported that it acted as a temporary depressor of the motor nerve fibres, and also to some extent as a local anæsthetic. In large doses it acted as a heart poison, and produced spasm not unlike strychnine. A solution containing 0.4 per cent. of this body, which Dunstan said should be called piperovatine, was so powerful that a single drop produced tingling and salivation. The oil in the leaves had the characteristics of a sesquiterpene. In conclusion, Dunstan suggested that although this body was not alkaline, and did not combine with acids, it was entitled to be called an alkaloid from its chemical constitution, as it was undoubtedly a pyridine derivative.—Jour. Chem. Soc., 1895, 94.

POLYGALACEÆ.

Adulteration of Senega Root.—A new adulteration of senega root has been found to have been practiced by an American firm, by mixing the roots of *Triosteum perfoliatum*, Linn., N. O. Caprifoliaceæ, with the genuine article to the extent of 25 per cent. It is interesting to note that this same root is also used as a substitute for ipecacuanha. The genus Triosteum comprises five species. Triosteum perfoliatum is most frequently found in the eastern parts of the U. S. The thick knotty rhizomes act as a purgative, and in larger doses as an emetic. In Georgia the rhizome is used for rheumatism; the hard seeds are supposed to furnish a

substitute for coffee. The drug was formerly official in North America. It is yellow to dark-brown in color, of peculiar shape, about 9 Cm. long, and shows traces of the aerial stems on top. The rootlets project from the main root as a rule 0.5 Cm. thick, but sometimes grow as thick as 1.2 Cm. They are on the whole very similar to senega, but they do not posses the characteristic keel of true senega root; therefore, on careful inspection, the difference is evident.—C. Hartwich in Archiv der Pharm., 1895, 113; Pharm. Runds., 1895, 105.

Chemical Investigation of Senega.—In the roots of Polygala senega have thus far been found: Senegin, polygalic acid, glucose, fatty bodies, and one substance which has been little investigated, though it possesses energetic action; it has been termed polygalite, and its presence was established by Chodat in 1887. Guillaume-Gentil has endeavored to obtain the last named substance, and has proceeded as follows: The hot aqueous extract of the root is evaporated to a dense fluid consistency, liberated from the mucous substance with absolute alcohol, mixed with basic acetate of lead, and allowed to stand twelve hours. The filtrate is treated with hydric sulphide, is again condensed into a dark brownish syrup and repeatedly dissolved in cold and then in hot alcohol. The alcohol extracts are concentrated and again dissolved in alcohol until finally a colorless dense residue is obtained. In the latter, when permitted to stand, crystals are formed in about six months, but in the exsiccator after only eight or ten days; these crystals become colorless after recrystallization from alcohol, melt at 138° and dissolve readily in water, with tolerable readiness in alcohol, and are almost insoluble in ether. Their aqueous solution does not reduce Fehling's solution, but after twenty-four hours a red precipitate may be observed at the bottom of the test tube. On the other hand, reducing properties are possessed by the aqueous solution of the syrup which is obtained from the extracts treated with hydric sulphide.—Pharm. Zeit., 1895, No. 29; and Schweiz. Wochenschr. Chem. Pharm., 1895, 197.

POLYGONACEÆ.

Rhubarb.—B. S. Proctor gives a table of results of the action of different solvents upon the root. The general conclusion is that the removal of the dark-colored outer portion ought not to be countenanced, since that portion is richer than the interior in the alcohol—soluble extractive matters, of which the medicinal value of the roots depends. The color of the powder which may indicate low percentage of active constituents and a high percentage of calcium oxalate. The odorous principles of the root may be extracted with chloroform without impairing the medicinal value of the drug, but the powder so deodorized will acquire smell again. If the chrysophanic acid is thoroughly extracted by benzol, a further development of the acid may be effected by the actions of the air, water and KOH. A proof spirit tincture should contain all that is active. An improvement

in the B. P. syrup consists in employing proof spirit or spirit 20 to 30 overproof, and adding this tincture to syrup.—Pharm. Jour. Trans., 1894, 233.

Rhubarb.—R. Usher points out that the effects of seedling cultivation of this plant are injurious. The inferior quality of the English rhubarb root of a few years ago was stated to be due to this cause. Since, however, propagation from offsets has been exclusively resorted to, the plant has been restored to its primitive form of development and the product greatly improved, and prejudices against English rhubarb root are rapidly disappearing.—Pharm. Jour. Trans., 1894, 200.

Rhubarb Stalks.—R. Otto has examined the petioles of several varieties of rhubarb in common use for culinary purposes, and finds that, in addition to considerable quantities of insoluble calcium oxalate, they contain as much as 2 to 3 per cent. of oxalic acid either in the free state, or as a water-soluble oxalate. Otto considers that the continued use of these petioles as a vegetable must be injurious to health.—London Jahrb., 1895; Apoth. Zeit., 1895, 354.

RANUNCULACEÆ.

Chelidonum Majus.—According to Orlow, chelidoxanthin is best obtained from the plant in the following method: The acidified watery extract is precipitated with picric acid, and the precipitate is washed with dilute alcohol and then warmed with ammonia to set free the picric acid. The residue of this is then dissolved in weak hydrochloric acid and precipitated with a strong solution of potassium iodide. The resulting compound is washed with cold water, weak ammonia, and ether successively, and then crystallized from alcohol or hot water. The chelidoxanthin obtained by this process forms a dark yellow powder or brownish crystal of bitter taste. By heating, it carbonizes, and a fluid distillate is obtained, a portion, however, subliming unchanged. It is easily soluble in alcohol and weak acids, slightly so in water, and insoluble in ether. It contains nitrogen, and behaves in most respects like an alkaloid. It is certainly not a glucoside. With strong sulphuric acid and vanadic acid it gives a red color, with potassium dichromate it gives a green, and with molybdic acid no color. It occurs in the plant in the proportions of from .005–.01 per cent., and is most abundant when the plant is in bloom; in early spring the plant contains no chelidoxanthin.—Pharm. Post, 1894, 437.

Hydrastis.—A. Vogl has examined a specimen of hydrastis that contained the rhizome of a monocotyledon, possibly cypripedium pubescens, which had been found previously admixed with senega (Vogl, Pharmakognosie, p. 356).—Pharm. Post., 1894, 484.

RHAMNEÆ.

Ventilago Madraspatana—The Coloring Principles of.—A. G. Perkin and J. J. Hummel obtained from this dye-stuff five crystalline substances,

including a new coloring principle, together with a wax and resinous coloring matter.—Jour. Chem. Soc., 1895, 923.

ROSACEÆ.

Rubus Villosus.—H. Harms examined the glucoside *villosin* and considers it to be one of the saponins. The tannin in dried drugs is from 11.89 to 17.42 per cent. and on heating yields pyrogallol, but on treatment with alkali yields neither gallic acid, protocatechuic acid, nor phloroglucol.—Amer. Jour. Pharm., 1894, 580.

Strawberries as a Medicine.—Strawberries have for a long time had a well established reputation as a remedy for the gout. A. George, in Annales de la Société Horticole de l'Aube, tells us that Linnæus, who was gouty, had much cause to extol the action of the fruit in this disease. At this epoch, when uric acid was unknown, he had the prescience that the chemical cause of gout was identical with that of gravel, and he expressed himself in a picturesque manner to one of his friends when he wrote to him: "I have the gout and you have the gravel; we have married two sisters." The only method that Linnæus found of easing his gout was by an abundant use of this fruit, to which he has made a graceful acknowledgment in his writings.—Science Siftings; Bull. Pharm., 1894, 471.

RUBIACEÆ.

Two False Cinchona Barks.—Hartwich (Pharm. Centralh., 1894, 569) speaks of two false barks; the one a Ladenbergia and evidently related to L. Magnolia, but differing therefrom in the less bright reddish-brown color; and the other formerly called China Trujillo but now introduced under the name of C. rubiginosa. This latter is said to contain not only no cinchona alkaloids, but not even any alkaloid.

Usnea upon Cinchona Barks.—E. Senft found most of the genus Usnea ceratina Ach. and a small specimen of U. cerat. var. sorediella Oliv. Very many were U. articulata (L) Hoffm. and U. intestiformis Ach. Only a small quantity of U. longissima Ach. and Ramalina farinacea (L.) Fr. were found.—Pharm. Post, 1895, 17.

Indian Government Cinchona Plantations.—The annual administration report on the Government cinchona department, Nilgiris, for the year 1893–94, recently issued by the Revenue Department of the Government of Madras, shows that at the close of the year 1892–93 there remained in stock 362,349 lbs. of bark; and this, with that harvested during the year, makes a total of 445,816 lbs.; but of this quantity 177,672 lbs. were disposed of as follows: Used in the factory for the manufacture of quinine and febrifuge (crown bark) 52,600 lbs.; used in the factory for the manufacture of quinine and febrifuge (red bark), 122,400 lbs.; sold to medical stores, Madras, 1,200 lbs.; sold to medical stores, Bombay, 800 lbs.; purchased by Co., Bombay, 672 lbs. Total, 177,672 lbs.—Ibid., 561.

Evodia Meliæfolia.—A. G. Perkin and J. J. Hummel find that the bark contains a basic coloring matter which behaves in the normal manner. A comparative dyeing experiment in wool indicated that evodia bark contains the equivalent of 3 per cent. of berberine hydrochloride. Experiments with toddalia gave similar results.—Jour. Chem. Soc., 1895, 413.

Hedyotis avicularia, Linné. (Geta-kola.)—Herb, branched; leaves, usually pale-green, when dry, 1 to 3 inches long; cymes, axillary, sessile, small, very dense flowered; calyx teeth variable. "Some Ceylon specimens have leaves with petiole ½ inch long, and caudate points, as in Beddome's figure" (J. D. Hooker). Used for cooling the bowels and in cutaneous diseases.—H. Kraemer, in Proc. N. C. Assoc., 1894.

Hedyotis vestita, Br. (Pita-endu-pala).—A stout herb 1 to 2 feet long, branches terete; leaves 2 to 4 inches long, greenish when dry; cymes inconspicuous; fruit minute. It is used in nervous diseases and intermittent fever. Considered also to be a blood purifier.—Ibid.

Histology of Ipecac.—H. G. Greenish describes the external characters of the plant. It was pointed out that during the growth of the creeping stem this became nodose, and roots were often given off from the nodes. Brazil "root" which he had examined from many bales was found to often contain both upright and creeping stem. The root is often of a brick-red color, which may be due to the soil in which it has grown, or to artificial coloring. At all events, most of it may be removed by washing. The well-developed root, has, of course, the well-known transverse annulations. The erect stem, on the contrary, has well-marked longitudinal striations. The young root is usually di-arch; sometimes, however, tri-arch. The perixylem consists of one layer of cells, and is surrounded by a well-marked endodermis, and outside this is a parenchyma of three or four layers of cells. The protoxylem consists entirely of tracheides, and spiral vessels are entirely absent. The excessive growth of the parts which cause the transverse annulations was then described. The mature root is loaded in parts with starch. On the transverse section may be seen on the outside a layer of flattened cork cells, produced from the phellogen, then a number of parenchyma cells, often inclosing bunches of raphides. The wood elements are, however, of great importance. Chromic acid is considered the best reagent for breaking up the wood into its elements. The chief of these are the tracheides. There are also the fibrous cells, ordinary parenchyma cells, and the so-called "intermediate cells." The starch found is fairly characteristic, occurring in grains nearly always compound, with a distinct hilum. In Brazil root they usually were about 12.5 millimeters in diameter, never more than 15. The alkaloids are said to exist in definite cells, but the author's investigations have led to no good result in this matter. In the stem there is the cork, very similar to that in the root; but there are some cells in the pericycle which are very character-

istic, as they have become sclerenchymatous. The elements of the wood, when split up with chromic acid, show tracheides, fibrous, parenchymatous, and "intermediate" cells, and, in addition, the peculiar sclerenchymatous cells of pericycle, which are sufficiently peculiar to enable one to detect stem in powdered root. Spiral vessels are also found here; and, lastly, there are the pith cells. The three characteristics of the stem, then, in opposition to the root, are as follows: (1) The sclerenchymatous cells; (2) spiral vessels; (3) pith cells. Practically no difference is seen between Brazil and Carthagena roots, with the exception of the size of the starch-grains, for they usually measure from 17 to 22 millimeters diameter. However, the starch in a large Brazil root may equal that in a small Carthagena root in size. The peculiar tracheides, the starch, and the emetine reaction (Cl gas in the alkaloid) will be found very useful in the examination of the powdered drug.—Pharm. Jour. Trans., 1895, 685.

Chemistry of Ipecac.—Former investigations by Paul and Cownley have demonstrated that ipecac root contains at least two alkaloids. Later they have found that one of these bases is soluble in caustic alkalies, and is obtainable in crystalline condition from ethereal solution, while the other is only obtained in amorphous condition. The salts of these bases are distinguished from one another in that those of the former do not crystallize, and that only the halogen salts and nitrate of the latter yield crystalline compounds. These investigators have retained the name *emetine* for the base insoluble in caustic alkalies, naming the other base *cephaëline*. Both of these principles are present in the Brazilian as well as the Carthagena ipecac. The alkaloids are separated by exhausting the drug with alcohol, treating with subacetate of lead, and acidifying the solution freed from lead. The alkaloids are separated by means of alkali and ether. These principles are characterized by the following: Emetine is amorphous; melting point 68° C.; forms crystalline salts with the halogens and nitric acid; the acetate, sulphate and oxalate do not crystallize; the platinochloride is amorphous, insoluble in water and alcohol; its empirical formula being $C_{15}H_{22}NO_2$. Cephaëline crystallizes from ether in silky needles, melting point being 96.98° C.; its salts are not crystalline; its empirical formula is $C_{14}H_{20}NO_2$. Commercial *emetine* consists of a mixture of both bases. Physiological experiments have shown that both possess like emetic properties.—Pharm. Jour. Trans., 1895, 690.

Ipecac Root.—L. F. Kebler (Amer. Jour. Pharm., 1895, 29) finds titration with volumetric acid solutions to give most encouraging results in assaying, and that the "fancy" root was frequently not so rich in alkaloid as the "wiry" root.

False Cultivated Ipecac.—F. H. figures this false root in connection with the true root. The cultivated root has been variously ascribed as coming from different plants by a number of authors, and differs from the

true root in that a red coloration is produced by vanillin + HCl, upon a cross-section of the lichen upon ipecac.—Pharm. Post, 1895, 251.

Ixora coccinea, Linné. (Ratambala). A branching shrub; leaves coriaceous, pale when dry, stipules with rigid cusps. Cymes rarely short peduncled; ramifications very short, articulate; bracts and bractecles imbricate; flowers scarlet, sessile, or very shortly petioled. Filaments long and anthers short for the genus. Stigma with short, revolute arms. "It is common in Ceylon, ascending to 2,000 feet" (Thwaites). The flowers and the bark are used for blood-shot eyes, and the leaves for sores and ulcers. A tincture of the root of this plant, it will be remembered, was compared with ipecac as an antidysenteric.—H. Kræmer, in Proc. N. C. Assoc., 1894.

Morinda Umbellata.—An examination of the coloring and other principles contained in Mang-Koudu. A. G. Perkin and J. J. Hummel examined the root bark, and find that the constituents more resemble madder than chay wat, although, like the latter, it contains but a single coloring matter. There are present, however, but only in small quantity, numerous yellow, crystalline substances, totally distinct from those found in chay wat, and, judging by their behavior, more nearly allied to those isolated by Schunck from madder. Eleven crystalline substances were isolated. In addition to these substances, mang-koudu contains a considerable amount of free acid, the nature of which has not yet been ascertained. No cane sugar was found in this root, a point which distinguishes it both from chay wat and from madder.—Jour. Chem. Soc., 1894, 851.

——— The dyeing properties of mang-koudu are practically identical with those of morinda root, with which it is related closely both botanically and chemically.—Ibid., 869.

Randia Dumetorum.—Vogtherr has subjected the fruits of *Randia dumetorum*, which are used in the East Indies as an emetic and as a remedy for dysentery, to chemical and microscopical examination. The poisonous properties of these fruits he attributes to a saponin, *randia saponin*, and to an acid, randic acid, which he has isolated from the pulp. The former of these bodies does not appear to stand in any near relation to Kobert's saponins: it resembles quillaiasapotoxin in many respects, but differs in the proportion of sapogenin yielded by its decomposition. Randic acid resembles Kobert's quillaic acid. The fruits were also found to contain a tannin and fat.—Archiv. der Pharm., 1894, 489.

New False Angustura Bark.—On two separate occasions during the past year parcels of bark supplied as Cusparia were found upon examination to be a substitution. It was at first thought that the bark was that of Esenbeckia febrifuga, the false Angustura first described by Maisch; but through E. M. Holmes a specimen of Esenbeckia was obtained; and after a comparative examination, aided by microscopical sections, it

was shown conclusively that this was not the case. There is every reason to believe that the bark in question is new to commerce. The following is a description of the bark: It occurs in flat or slightly incurved pieces of varying length and width, and from $\frac{1}{16}$ to $\frac{1}{8}$ or rarely as much as $\frac{3}{8}$ of an inch in thickness. The outer surface is of a grayish-brown color, rough from the presence of many wart-like excrescences of the periderm, and frequently bearing closely adherent lichens of a yellow or yellowish-red color, marked with numerous black spots; beneath the corky layer the color is dark greenish-gray. The inner surface is coarsely striated longitudinally, and yellow, yellowish-brown, and brown; fracture hard, brittle, showing numerous closely adherent concentric laminæ. A transverse section under the microscope shows numerous concentrically arranged large groups of sclerenchymatous cells. No chemical examination of the bark has been made. It has so far been impossible to trace the bark further than Leipsic, but it is hoped that more information may be gained concerning it, when the advisability of making a further communication will be considered.—John Barday, in Pharm. Jour. Trans., 1894.

Levulose from the Dried Peel of Citrus Aurantium Chinensis.—B. W. Bauer.—The dried orange peel (50 Gms.) was softened with acetic acid and boiled with water; 4.794 Gms. of crude sugar was obtained. After treatment with animal charcoal, 1.458 Gms. of a very hygroscopic substance was obtained, $[a]_D = -85.24°$. The rotation did not change after 24 hours. The animal charcoal employed for decolorizing was covered with white rosettes of crystals.—Jour. Chem. Soc. (Abs.), 1895, 129.

Empleurum serrulatum.—J. C. Umney has compared the oil and extractive of Empleurum serrulatum with Barosma betulina and B. serratifolia, and concludes that while the leaves of E. serrulatum show certain botanical and chemical affinities with buchu, their use as a substitute for tha. drug is not permissible without therapeutic examination.—Pharm. Jourt Trans., 1895, 796.

Uses of the Eucalyptus.—As wider information is secured, it is discovered that the industrial uses to which the various products of the tree may be applied are of endless variety and very great value. To say nothing of the ordinary commercial purposes for which the wood is employed, such as carriage-building and cabinet-making, the bark is extensively consumed in the tanning industry, while the fibres are widely used in the manufacture of cordage and mats. For this particular purpose, the most desirable species are *E. tetrodonta*, *microcorys*, *obliqua*, *odorata*, and *amygdalina*. The following species are devoted to the manufacture of packing-paper: *E. corymbosa*, *fissilis*, *rostrata*, *stuartiana*, *longifolia*, *leucoxylon*, and *gonocalyx*. The bark from *E. corymbosa* is also largely used in the manufacture of blotting and filter paper, while another species, known as *E. sideroxylon*, is valuable for the production of vegetable

naphtha. From a distillation of the leaves, various essences utilized by perfumers and liquor-manufacturers are derived; and it is learned that in Australia these particular products are esteemed of great value for purposes of illumination. The species especially so adapted are *E. globulus*, *gonocalyx*, *odorata*, *sideroxylon*, and *woolsii*, and of these *E. gonocalyx* in particular, on account of the brilliant and inodorous flame.—Bull. Pharm., 1894, 460.

Ceará Jaborandi.—E. M. Holmes points out that a new kind of jaborandi has been offered, and that it resembles the genuine article in several points. The leaflets resemble those of the true Pernambuco Jaborandi in their coriaceous or leathery texture, and in the dark green or brownish-green color of the upper surface and the emarginate apex, but differ in the under surface of the leaf being covered with short, curved, simple unicellular hairs. On the upper surfaces these hairs are present in the midrib, but are only sparingly visible elsewhere on the upper surface. The margin of the leaf is also strongly incurved. When chewed it does not cause a flow of saliva. According to Paul and Cownley the leaves do not contain any considerable amount of a base, forming a crystallizable nitrate corresponding to the salt of pilocarpine.—Pharm. Jour. Trans., 1894, 1065.

To Preserve Lemons.—Lemons are invaluable in the sick room and cannot be replaced by citric acid or any artificial substance, consequently their preservation is of importance. They can be preserved by rubbing the lemons over with wadding soaked in pure paraffin oil and then wrapping them in tin foil.—Amer. Drug. and Pharm. Rec., 1894.

Limes.—The sour lime-tree, which yields lime-juice and the essential oil of limes, was introduced into the West Indian Islands from the East. In these islands the juice is obtainable by compressing the fresh ripe fruits between heavy rollers. It is exported in the raw state or concentrated. The latter kind is obtained by evaporating the raw juice in copper or enameled iron pans until it is reduced to about one-eighth or one-tenth of the original bulk. When it is exported it is a dark viscid fluid of the consistence of treacle. From the rind of the fresh fruits there is obtained by the ecuelling process a fine essence which is exported in copper vessels. The process, which is a slow one, is performed by women and girls. The task per day is measured in fluid ounces. By distilling the raw lime-juice a spirit is obtained known as oil of limes. The essential oil of limes, extracted by hand, is far more valuable than the oil of limes, as the perfume of the latter is injuriously affected by the heat necessary for distillation.—Brit. and Col. Drug., 1894, 548.

Melaleuca Cajuputi, Rox.—P. Karpow in a histological dissertation has taken up the leaves and stem. The leaves are formed in the solateral type, lanceolate, entire, short-petioled, smooth and hard. The nerves are parallel. The oil cells containing the ethereal oil are bounded by the

palisade layer and spongy parenchyma and enter deep into the mesophyll. The stem consists of a collateral type of bundle. Directly beneath the hypoderma are the oil cells in a pair or singly. The pith parenchyma contains aleurone grains and crystals of CaC_2O_4.—Pharm. Post, 1894, 427.

Peganum harmala, L.—The seeds are used in India for their red coloring properties, and it evidently contains properties similar to Cannabis indica and Secale cornutum.—Pharm. Post, 1894, 531.

Toddalia aculeata.—A. G. Perkin and J. J. Hummel have examined the inner bark of this species of Toddalia, and find it to contain a trace of berberine and a quantity of a sticky resinous product, which was insoluble in water or dilute acids, but readily soluble in ether. The central woody portion of the root did not yield berberine.—Jour. Chem. Soc., 1895, 413.

Tooth-Ache Bush.—A common name applied in various localities to Aralia spinosa, L., and to various species of Xanthoxylum. H. Kraemer determined a specimen of so-called "tooth-ache bush" collected on the Sea Islands off of South Carolina. It consisted of a few pinnate leaves; seven leaflets, the rhachis being quite prickly. These characters with the crenate margin of leaflets and the peculiar aromatic and acrid taste prove it to be the Xanthoxylum carolinianum, Lam. (now X. clava-herculis, L.) This species is known as the "prickly ash" of the Southern States, G. H. Colton (Amer. Jour. Pharm., 1880, 191) subjected the carefully identified bark to proximate examination. He obtained besides the fixed and volatile oil (the latter in a very small quantity) a little tannin, a crystallizable and an acrid resin, a small quantity of a yellowish, amorphous, very bitter substance which he believed to be alkaloidal in its characters (it seems to differ from berberine, being soluble in alcohol and water, insoluble in benzine, ether and chloroform, and becomes purplish brown with sulphuric acid and bright red, changing to yellow with nitric acid), but which requires further examination. The ash contained chlorides, carbonates and phosphates of potassium, calcium and magnesium—Lloyd isolated (Nat. Disp.) in 1876 from Xanthoxylum fraxineum, Willd., a crystalline substance which is identical with the one previously mentioned; being insoluble in water, soluble in boiling alcohol turned yellow by nitric acid and dissolves with a deep red color in sulphuric acid. The Xanthoxylum clava-herculis is supposed to possess similar properties to X. fraxineum, Willd.—Alumni. Jour., 1894, 180.

SALICACEÆ.

Salicaceæ of Brazil.—T. Peckolt mentions salix martiana Leybold, a tree 6 metres high and 17 Cm. in diameter. The bark is grayish-brown and the leaves are linear-lanceolate. The wood, leaves, stem and flowers are used in the form of an infusion.—Pharm. Runds., 1894, 240.

Lawsonia Inemeris.—Ehrmann has made a botanical and chemical ex-

amination of henna and figures a section of the leaf containing numerous crystals of calcium oxalate. It contains traces of an alkaloid; 1.20 per cent. of a resin soluble in ether; tannin, 0.70; sugar (reducing) 1.20; starch, 5.22; albumin, 5.98; gum and pectous substances, 7.60, etc.—Jour. Pharm. Chim., 1894, 591.

Aspen Tar.—W. Adolphi.—Aspen tar from Populus tremula is a commercial article in Central Russia. It is a black, oily liquid of sp. gr. 1.0586 at 15°, and has a peculiar and unpleasant odor. The crystalline leaflets which are visible in the body of the liquid do not give the reactions of pimaric acid. The tar is completely soluble in absolute alcohol, acetone or alkalies, and 72 per cent. of it distils below 300°, leaving a little pitchy residue. The distillate contains acetic, propionic, butyric, valeric and caproic acids. The phenols present form 16.7 per cent. of the tar distilled, and boiled at 200–290°, more than half distilling at 250–270°; the fraction boiling at 230° gives the catechol reaction, while the portions boiling at higher temperature give the pyrogallol reaction with ferric chloride; guaiacol is also present. The hydrocarbons boil at 100–340°, the major part distilling at 210–260°; paraffin melting at 38° was isolated from the fraction boiling at 290–340°.—Arch. der. Pharm., 1894, 321.

SAPINDACEÆ.

Cardiospermum halicacabum, Linnè, (Penela-we).—A climbing herb, branches, slender, furrowed; leaves deltoid or ovate, leaflets deeply cut; flowers, white and small; seeds officinal. The whole plant is used in cases of rheumatism, nervous diseases, orchitis and dropsy. It is used also as a hair-wash to remove scurf. The root is considered aperient.—H. Kraemer in Materia Medica of Ceylon in Proc. N. C. Pharm. Assoc., 1894.

SAPOTACEÆ.

Palaginum Gutta, Burck, *P. Treubii*, Burck.—A. Lewschin in his dissertation (from the laboratory of W. A. Tschomirow in Moscow) has five plates and considers the histology of these plants. The stem is built upon the type of an open fibro-vascular bundle. The outer portion of the bark has a characteristic thickened and one-sided periderm. The cells of the cortex contain tannin. Some of the cells contain crystals or crypto-crystalline powder of CaC_2O_4. Aleurone grains are found only in the cells close to the sclerenchyma. The secretion (gum) cells have a much larger perimeter on the radial section than the parenchyma. These cells may be separated by use of chromic acid or better by maceration with Labarraques' solution for 6 or 8 days. The contents are viscous and most of them are soluble in $CHCl_3$, CS_2 or C_6H_6; what remains is CaC_2O_4.—Pharm. Post, 1894, 403.

Seeds of Moâbi.—H. Lecomte and A. Herbert.—The tree which yields

these belongs to the family of the Sapotaceæ growing in French Congo. The sap of the bark yields on coagulation a product rich in gutta-percha. The nuts yield from 30 to 35 per cent. of a fatty matter. The cake after the oily matter has been dissolved out by benzine, contains 4.05 per cent. of nitrogen, and may be valuable as a manure or as cattle food.—Compt. rend., Vol., cxx., No. 7.

SCITAMINEÆ.

Detection of Exhausted Ginger.—A. H. Allen and C. G. Moor (Analyst. xix., 124, Amer. Jour. Pharm., 1894, 342) report on the analysis of genuine ginger by R. Waterhouse as follows:

Origin of Ginger.	*N.* Jamaica.	*O.* Jamaica.	*P.* Jamaica.	*Q.* Jamaica.	*R.* Jamaica.	*S.* Cochin.	*T.* Cochin.	*U.* Cochin.	*V.* African.	*W.* African.	Average.
Moisture	11.26	10.98	13.95	12.76	13.96	10.64	13.50	13.23	15.97	13.70	13.00
Total ash	—	—	3.90	3.29	3.45	—	3.81	3.62	3.65	3.90	3.66
Soluble ash	1.70	1.41	3.05	1.75	1.71	1.71	2.03	2.04	2.28	2.41	2.01
Cold-water extract	15.65	13.25	14.40	12.25	11.85	13.00	8.65	11.65	10.80	10.10	12.12

SCROPHULARIACEÆ.

Scrophularia nodosa.—F. Koch finds in addition to the constituents already found, a tannin (iron-green), a bitter principle (scrophularin) a stearopten (scrophularosmin) and dulcit.—Arch. der Pharm., 1895, 77.

Herpestris monniera, H. B. & K. (Lunuvila). A creeping herb, quite glabrous, rather succulent; branches, 4–10 inches long. The whole plant is a mild purgative; it is also used as a fomentation for erysipelas and elephantiasis.—H. Kraemer in Proc. N. C. Pharm. Assoc, 1894.

SOLANACEÆ.

Capsicum.—C. Hartwich has made two classes of capsicum, upon the character of the cell walls, which can be made out with a loupe. Class (a) includes those seeds that have upon a cross-section a columnar structure, with relatively thin walls, and the modified walls upon the outside of the cell are thick. To this type belong C. frutescens, Wild., and C. fastigatum, Bl. Seeds of C. cerasiforme, Willd., C. convides. Miller and C. violaceum also probably belong with this class, but the seeds examined were not wholly ripe.

Class B includes those seeds, whose side walls on cross-section are plump, and the modified wall upon the outside is thin. To this type belong C. annuum, L. and C. longum, D. C.—Pharm. Post, 1894, 609.

Ephedra vulgaris.—The action of this drug and its two alkaloids, has been studied by E. T. Grache. It is a popular remedy in Poland and

Russia for many diseases. Grache concludes that in acute and chronic articular rheumatism it is decidedly inferior to the salicylates.—*Monthly Mag.*; Brit. and Col. Drug., 1895, 305.

Henbane.—R. Usher suggests that the plants should be classified in the order of their value into (1) biennial henbane of second year's growth; (2) biennial henbane of first year's growth; (3) British annual henbane; and (4) German henbane. It is now found possible, after a long and careful study of its cultivation, to preserve the first from the attacks of insects to which it is ordinarily subject, and thus loss of material and temptation to substitute inferior varieties are prevented. Pharm. Jour. Trans., 1894, 200.

Solanum aculeatissimum.—This plant is indigenous to Brazil, and is the subject of an elaborate description by Peckolt. It is of interest chiefly because its fruit contains small quantities of solanine. The plant is 20 to 30 cms. high, shrub-like, with all its members soft and covered with needle-shaped prickles. The leaves are cordate or oval, hairy on the under-surface and covered with long prickles. The flower has a firm pedicel, with red florets in the form of a false umbel, with white coronas. The berries are in a slightly swollen cup, and are round, 2 to 3 cm. in diameter, smooth, sapless, and in the unripe state are white, with green stripes and patches. When ripe, they are of a yellow or orange color. The numerous seeds are flat and three-cornered, with broad membranous edges. The plant bears fruit twice a year. Animals carefully avoid it. Magnesia and milk, followed by castor oil, are said to act as an antidote for it. The analysis of the fruit gave the following results:

	Per cent.	Per cent.
Water	(1) 95.0	(2) 94.93
Solanine	.51	.16
Wax	.03	.06
Fat	.21	.26
Resin	.17	.095
Sugar	.73	.85
Coloring matter	.69	.86
Gum and albumen	.44	.59
Ashes	1.96	1.98

To extract the solanine, the following method is adopted:—The ripe fruit is bruised in a marble mortar to a fairly homogeneous mass, and mixed with fresh lime and dried by gentle warming, powdered and extracted with boiling alcohol (.839), and the alcohol distilled off. The residue is allowed to cool, when a crystalline mass separates out. This can be purified by re-crystallization from alcohol. Five kilograms of fresh yellow fruit yielded 25.85 grains of solanine, and the same quantity of the red fruit gave 7.85 grains.—Zeitschr Oest. Apoth. Ver., 1894, 390.

Pharmacological Investigation of Manaca Roots.—J. Brandl.—The sub-

stances separated were manacin, $C_{22}H_{33}N_2O_{10}$; manaceïn, $C_{15}H_{25}N_2O_3$, a fluorescent substance identical with the aesculetin of Zwenger, valeric acid, and a material resembling humous substance. Lenardson, who has worked at the same plant, gives the formula for manacin as $C_{15}H_{23}N_4O_5$. Manacin is convertible into manaceïn by the action of certain micro-organisms. In addition to botanical details, the bulk of the research refers to the physiological actions of manacin, the most marked of which is a stimulating action of the motor end plates and of secreting glands. Manaceïn causes very similar results.—Zeit. Biol., 1894, 251; Jour. Chem. Soc., 1895, 57.

Scopolia atropoides, Link.—An article by J. Nevinny containing a history and biography of this drug with an illustration of the rhizome and leaf.—Pharm. Post, 1894, 333, 349 and 357. (See also Ibid., 380).

Folia Scopoliæ Carniolicæ.—J. B. Nagelvoort reports that the leaves of this plant contain no alkaloid. The examination was made with plants cultivated by the author, and the result is curious, inasmuch as Dunstan and Chaston found the root of this plant to contain a considerable amount of hyoscyamine.—Amer. Jour. Pharm., 1894, 431.

Withania Coagulans, Duval.—The fruit, known in India as Kagnaj, is used by the natives in the coagulation of milk.—Pharm. Post., 1894, 531.

STERCULIACEÆ.

Commercial Varieties of Cacao.—E. S. Bastin has examined 10 commercial varieties and finds that the starches are very similar in appearance. They are spherical grains, hilum central, and usually quite distinct and sometimes fissured; the fissure may be simple and straight or somewhat curved, angular or stellate; one, or sometimes two circular lines, usually quite distinct about the hilum, but the grains otherwise mostly unmarked or smooth; some of the grains are compound, and these may be double, triple, or even quadruple. While the starches of the cacaos resembled each other closely, yet they are unlike those of the other drugs.—Amer. Jour. Pharm., 1894, 376.

——— *Chemical Examinations.*—Wm. E. Ridenour obtained the following:

	Bahia.	Suriman.	Java.	Trinidad.	Ariba.	Caracas.	Granada.	Roasted Trinidad.	Tobasco.	Roasted Caracas.	Machalle.	Maracaybo.	Average.
Fat (cacao butter)	42.10	41.03	45.40	43.66	43.31	36.81	44.11	41.89	50.95	37.63	46.84	42.20	42.99
Theobromine	1.08	.93	1.16	.85	.86	1.13	.75	.95	1.15	.99	.76	1.03	.97
Albuminoids	7.50	10.54	9.25	11.90	10.14	10.59	9.76	12.02	7.85	12.36	12.69	11.56	10.51
Glucose	1.07	1.27	1.23	1.38	.42	2.76	1.81	1.48	.94	1.76	1.60	1.09	1.40
Saccharose	.51	.35	.51	.32	6.37	1.56	.55	.28	2.72	.51	.46	1.36	1.29
Starch	7.53	3.61	5.17	4.98	1.58	3.81	6.27	5.70	3.51	6.07	1.35	1.69	4.27
Lignin	7.86	3.90	6.10	5.65	4.62	3.28	5.55	5.87	6 44	9.05	5.95	7.16	5.95
Cellulose	13.80	16.24	13.85	13.01	14.07	16.35	13.49	19.64	12.57	11.69	11.32	17.32	14.44
Extractive matter (by difference)	8.99	13.53	8.90	8.31	9.00	12.72	9.72	5.84	9.26	9.22	9.02	6.79	9.30
Moisture	5.96	5.55	5.12	6.34	5.90	6.63	5.28	2.63	1.55	5.69	5.86	5.67	5.18
Ash	3.60	3.05	3.31	3.60	3.73	4.36	2.71	3.70	3.06	5.03	4.15	4.13	3.70

—Ibid., 1895, 209.

Commercial Cocoas.—F. Yaple examined twelve samples of commercial articles, and found them to contain on an average: moisture, 4.11 per cent.; ash, 5.51; fat, 32.33; extractive, 6.94; theobromine, 0.94; starch, 17.43; albuminoids, 14.56.—Ibid., 318.

Nutritive Value of Cocoa., H. Cohn.—The constituents of cocoa were separated by methods which are described and their amount estimated. The beans and powdered cocoas of commerce were used. The former contained 48–50 per cent. of fat, and 10.8 of proteid; the latter, 32–33 per cent. of fat, 13.8 of proteid and 12 of starch. Experiments in relation to its nutritive value were carried out in the usual way; the fat was found to be well digested, but the proteid not, nearly 50 per cent. of the latter being unused.—Zeit. f. physiol. Chim., 1894, 1.

Helicteres Isora, L.—The fruit, known in India as Kawun, is a favorite household remedy in the diseases of children. Its peculiar form, more than its medicinal constituents, have given it its reputation—Pharm. Post, 1894, 531.

Composition of Kola-Nut.—The chemical composition of Kola-nut has again lately been thoroughly studied by C. Uffelman and A. Boerner. The average of ten analyses gave the following results: Water, 13.35 per cent.; total nitrogen, 1.53 per cent.; caffeine, including theobromine, 2.08 per cent.; extracted by ether, 1.35 per cent.; starch, 45.44 per cent.; tannin, 3.79 per cent.; cellulose, 7.01 per cent.; other nitrogenous substances, 18.21 per cent.; mineral matter, 2.9 per cent. The caffeine was estimated by Mulder's method, but instead of boiling the powdered nut with pure water, 5 per cent. sulphuric acid was used. The starch was estimated gravimetrically as dextrose, having previously been converted into that substance by subjecting it to steam heat. The tannin was estimated according to Fleck's method, with the modification that 5 Gm. were boiled for one hour with 200 C.c. of water in a flask holding 500 C.c., whereupon the latter was filled with water up to 500 C.c.; 200 C.c. were then filtered off, and from this filtrate the tannin was precipitated. Only a trace of sugar was found.—Zeitschr. f. angew. Chem., xxiii., 810; Analyst. xx., 42; Pharm. Runds., 1895, 66.

The Kola Nuts of Congo.—It is well known that the natives of the Congo district use kola nuts largely against muscular fatigue. According to Porkin, who has been observing the matter for some time with care, the blacks only use the germinated nuts. When they gather the nuts they lay them in a corner of their huts, which is kept moist. After three or four weeks, the nuts commence to germinate. They believe that the germinated fruit is much stronger than the others. Whether the germination causes any increase in the active principle or not is not known, but the question is certainly worth the trouble of an investigation.—Gazette Médicale de Liege; Amer. Drug. and Pharm. Rec., 1894.

Sterculia Zaranica.—Boorsma finds the seeds of this to contain a non-toxic alkaloid.—Pharm. Zeit., 1895, 339.

TERNSTROEMIACEÆ.

American Tea.—C. M. Shepard has successfully cultivated tea from the plants of the Assam hybrid variety, the stock of which had been thoroughly acclimatized by about 30 years' growth in the United States. The best quality is described as a rather handsome, small, even blackish leaf, with Pekoe flower.—Chem. and Drug., 1894, 16.

Tea Seed.—David Hooper (Pharm. Jour. and Trans., liv., 605), has contributed an interesting paper on the subject of tea seed and tea oil. The seeds are one-third to five-eighths of an inch in diameter, rounded or hemispherical, and of a chocolate-brown color. A thin, brittle integument incloses the whitish oily kernel. When the brown husks are removed, and the kernels dried in a water oven, they lose one-third of their weight of water. The dried kernels, reduced to fine powder, contain the following constituents:

Fixed oil	22.9 per cent.
Albuminoids	8.5 "
Saponin	9.1 "
Carbohydrates	19.9 "
Starch	32.5 "
Fiber	3.8 "
Mineral matter (ash)	3.3 "
	100.00

The fixed oil is much less in quantity than is found in the Chinese seeds, and is about the same as that yielded by Assam tea seed (20 per cent.). The oil is bitter and acrid, but does not deposit or thicken after being kept in an exposed situation as long as a week.

The following conclusions are arrived at:

(1) Tea seed is not suitable for manufacturing a fixed oil. The proportion of oil in the seed is much smaller than that found in well-known oil-bearers, as sesame, cocoanut and castor. The oil is difficult to express on account of the emulsifying property of the saponin. The saponin is poisonous, and appears to dissolve to some extent on every occasion in the oil, which is a damaging feature, and care should be taken to obtain edible materials from wholesome sources.

(2) Tea seed should be used as a manure. The amount of nitrogen is not so high as in many poonacs, but is higher than the amount contained in farmyard manure; and its application would be beneficial to the tea if beaten into a powder and placed in the ground near the roots of the tea bushes.

(3) Tea seed should be dried as an insecticide. Insects are known not

to attack the seed cakes of the "bassia" and "neem" or "margosa," because of the acrid principles contained in them. For the same reason they would keep away from substances containing the poisonous saponin, and would be killed with a strong infusion of the seeds. The seed could be used in two ways, either as a decoction or as a dusting powder. In the first case, the bruised seed should be allowed to stand in boiling water, and then filtered from the fibrous material. The clear liquid may then be applied to the plants infested with the pest. Or the seeds may be reduced to fine powder and sprinkled over the plant or near the ground where the insect or blight abounds.

Caffeine and Cheap Tea.—Caffeine is chiefly made from sweepings of tea warehouses, which can be purchased at from 4 d. to 5 d. per lb. Recently some Germans have hit upon a method of getting their caffeine for next to nothing. The tea sweepings have been bought in the London market, taken to Germany, all the actual dust tea removed by sifting, and the coarser particles of tea, after passing over a magnet to remove particles of iron, have been returned to the London market and offered as drinkable tea. The character of this tea was detected by the use of a lens, which revealed the particles of wood arising from the opening of tea chests in dock warehouses. These it is impossible to remove from the tea sweepings. The residual dust serves as the source of caffeine.—Pharm. Jour. Trans., 1895, 642.

UMBELLIFERÆ.

The Asafetida Plants.—E. M. Holmes records a communication from J. E. T. Aitchison, who is traveling in the East, endeavoring to determine the source of several of the fœtid gum resins. In Kashmeer he has come upon an authentic specimen of Ferula narthex, Boiss, at the very locality where Falmer originally found the plant in 1838. He also finds that Ferula jaeshkeana is plentiful all around Gulmerg, and that the juice in no way resembles that of the asafetida-producing Ferulas. It is very evident that although there may be a number of plants capable of yielding an asafetida, the drug is only collected in certain localities, and not from all species capable of yielding it.—Pharm. Jour. Trans., 1894, 131.

Liquid Apiol.—L. Ough gives the following method of preparation when using ½ to 1 cwt. of seeds. The freshly powdered seeds are thoroughly damped with alcohol (s. g. 0.833), packed in a percolator, and after standing forty-eight hours percolation is continued with alcohol, ½ gal. being used to every pound of seeds taken. The bulk of alcohol is recovered from the bright green alcoholic liquor by distillation, and the remainder driven off in an open vessel by means of a water-bath. The residue on cooling deposits a quantity of a waxy-looking solid, from which the apiol is readily separated as a dark-green oily-looking liquid with a sp. gr. of 1.036, the yield being about 7.5 per cent.—Chem. Drug., 1894, 17.

Resin of Thapsia.—The commercial variety of thapsia (*Thapsia garganica*) was the subject of an investigation in 1883 by Canzoneri, who identified in it the following bodies: (1) A bibasic acid of the oxalic series ($C_{16}H_{30}O_4$), termed thapsic acid; (2) Normal caprylic acid; (3) A blistering substance, in lamellæ melting at 87°, soluble in alcohol and ether, slightly soluble in alkalies; (4) A little wax and resin. An Italian chemist has just made an examination of the resin of the plant, as found in commerce, and finds present in it: (1) Cholesterin; (2) Isovaleric, caproic, and caprylic acids; (3) Angelic acid; (4) Euphorbione; (5) A terpene and a camphor; (6) An aromatic oil; (7) A resin containing sulphur; (8) Wax, gum and fat; (9) Thapsic acid, $C_{16}H_{30}O_4$; (10) The vesicatory substance above-mentioned. The presence of several of these bodies in the commercial resin renders it highly probable that it is adulterated and not sold in its natural state.—Boll. Farm; Jour. Pharm. Chim., 1895, 316.

Cicuta virosa var. maculata.—L. H. Pammel describes and illustrates the macroscopical and microscopical appearance of the rhizome. The rhizome has a radish-like but unpleasant odor and similar persistent taste. It consists of a brown rind, a light yellowish central fibrovascular bundle, and between the two a dark brown layer of cells containing resin. The medullary rays are 2 to 3 cells wide, and extend from the middle of the fibrovascular bundle to the centre. These cells contain many small starch grains, as do also the parenchyma cells of the fibrovascular bundle. Most of the rhizome consists of parenchyma cells with numerous intercellular spaces and cells containing resin. This latter is the active principle, and occurs in the dry root in about 3.5 per cent. (fresh root 0.2 per cent.) and is called by Böhm *cicutin*. These experiments confirm the labors of Power in the non-poisonous properties of the wild Pastinaca sativa, and the poisoning by this root is due to admixtures with cicuta virosa var. maculata as the experiments of T. H. Pammel indicate.—Pharm. Rund., 1895, 102.

URTICACEÆ.

Hops.—J. Austen considers the planting, training, picking, drying, and diseases of the hop-plant. For medicinal preparations hops should not be more than one year old. He considers that an ammoniated tincture would also be more active than the present preparation, as the proof spirit cannot take up the whole of the resin and wax found in the lupulin.—Pharm. Jour. Trans., 1895, 720.

Hops.—Bavaria is the largest hop-exporting country, and next to England the largest producing country in the world. The proportion of production in England averages 8.75 cwt. per acre, while that of Bavaria is only 5.15 cwt.—Brit. and Col. Drug., 1894, 625.

Blight or Hop-powder.—The Board of Customs have approved of the

following formula for the manufacture of blight or hop powder in approved premises, viz.:

Take of

Tobacco, finely powdered	75 parts.
Sulphur	28 "
Asafœtida	5 "
Sago flour	3 "

in lieu of the formula shown in paragraph 465 of the Code and General Order of 1892.—Ibid., 129.

VERBENACEÆ.

Gmelina asiatica, Linné. (Demata.) A shrub spinescent or unarmed; leaves entire or coarsely lobed, beneath glaucescent, from a close coat of minute glands. Racemes terminal. The bark is employed in bilious fever and in indigestion attended with pains.—H. Kraemer, in Proc. N. C. Pharm. Assoc., 1894.

MATERIA MEDICA (ANIMAL).

Beeswax.—L. F. Kebler examined 5 samples and compared the results with a pure sample No. 1, as follows:

Serial Number.	M. P. C°.	Sp. Gr. at 15° C.	Acid Number.	Ether Number.	Total.	Ratio.	Adulterants.
1	63.8	0.964	19.60	75.60	95.20	3.857	———
2	48.0	0.925	25.13	48.30	73.43	1.122	Resin, paraffin, chrome yellow.
3	52.0	0.910	4.20	12.60	16.80	3.000	Yellow ochre, earthy matter, paraffin.
4	55.0	0.925	4.61	16.10	20.71	3.492	Earthy matter, paraffin, hæmatite.
5	66.0	0.935	11.20	37.61	48.81	3.358	Mineral wax.
6	74.0	0.921	10.50	19.60	30.10	1.866	Mineral wax.

Acids of Beeswax.—T. Marie describes a method for the extraction of the free acids in beeswax, which gives good results if it is applied to mixtures of acids, so long as bodies belonging to other organic series are absent. Beeswax, when treated by boiling alcohol, yields to this solvent not only the free acids present, but also hydrocarbons, oleic compounds, coloring matters and myricin, which are difficult to separate properly. The method adopted for obtaining the acids free from these other substances is as follows: After the wax has been treated by the boiling alcohol the greater part of the latter is subsequently distilled. The cooled and crystalline residue is then squeezed to separate oleic compounds and coloring

matters, after which the solid cake is melted, washed repeatedly with boiling water, and further decolorized by charcoal and filtration through paper. The slightly yellow mass thus obtained melts at 70°. This, after being heated with potash and lime, is cooled, powdered and mixed with a large quantity of water, which is then heated to ebullition. Dilute hydrochloric acid is then added to neutralize the alkali, and the free acids of the wax combine with the soluble calcium salts in the mixture to form insoluble compounds. The latter are separated, washed and dried, then treated with boiling alcohol and benzin to remove neutral substances, and decomposed. The acids thus isolated, after crystallization from alcohol, which removes a small quantity of palmitic acid formed from the myricin, melt at 79°–80°. By further treatment, with methylic alcohol, cerotic acid is dissolved out, and on crystallizing is found to melt at 76°, the melting point being raised to 77.5° after a single crystallization from ethylic alcohol. The residue melts at 78°, and contains melissic acid, described as identical with that extracted from carnauba wax by Story, Maskelyne and Pieverling. Crude cerotic acid is said to contain from 30 to 40 per cent. of analogous acids, and Marie announced his intention of further studying the pure compound and its derivatives.—Pharm. Jour. Trans., 1894, 172, from Comp. rend., cxix., 428.

Examination of Wax.—A. Kremel does not consider Hübl's saponification method as sufficient for determining the purity of a sample of wax, but that the sp. gr. determination is necessary to the qualitative determination of stearin resin and Japan wax. Hübl's method is used by both Benedict and Mangold, but consumes much time, although it gives concordant results. The refractometric method may be used in determining ceresin or Japan wax, but the combined adulteration is not ascertained.—Pharm. Centralh., 1894, 596.

Determining the Presence of Tallow and Glycerin in Wax.—Wax, says Mansfield, is most frequently adulterated with tallow. For its dectection, as wax contains naturally no glycerides, the following process is recommended: From 10 to 20 parts of the wax to be investigated is saponified by any of the ordinary agencies, and dissolved in water. Dilute sulphuric acid is then added, and the solution agitated. The precipitate is washed, and the wash-water is mixed with the filtrate, and the whole neutralized, placed on the water-bath, and evaporated until a crust of salt begins to appear. The residue is dissolved in strong alcohol, filtered, and the filtrate mixed with one and a half volumes of ether. The alcohol and ether are distilled off, and the residue in the matrass is collected, dried and weighed. If necessary, the direct amount of glycerin may be determined by the well-known bichromate method.—Pharm. Centralh., 1895, 596.

Castoreum has recently been studied by two French chemists, Beauregard and Pilliet, who find that the explanation of its source so long ac-

cepted and taught needs some modification. The glands in the groin of the beaver now appear to be simply extensions of the prepuce in globular form, which is lined with villiform epithelium. Each of these innumerable villi is covered with smaller and smaller projections, one upon the other to form a papillary structure, and the castor found there is simply the sebaceous secretion in the form of the stratified pavement epithelium of this structure.—Squibb's Ephem., 1895, 1600.

Statistics on Cod-Liver Oil.—The following statistics of cod fisheries of Norway, and production of cod-liver oil and livers for industrial oils from 1888 to 1895, have been compiled from official reports by J. Rye Holmboe, Tromso, Norway, for publication:

PRODUCTION OF COD-LIVER OIL—IN HECTOLITRES.

District.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	Average 1888–94.	1895. 30 April.
Lofoten	16,100	12,900	16,700	18,200	8,100	18,600	12,300	14,700	12,300
Tromso Amt.	450	560	222	100	1,154	2,344	1,729	974	681
Vesteraalen..	2,233	1,168	1,535	707	425	3,940	2,047	1,772	1,225
Ydersiden ...	744	560	250	300	630	625	482	513	879
Nordland	.....	31	.....	23	.....	95	.....	21	
Vestlandet*..	9,000	5,700	9,700	5,985	7,850	6,196	2,500	6,705	1,205
Finmarken ..	.....	4,267	1,400	772	3,899	2,076	4,168	2,369	394
	28,527	25,186	29,807	26,087	22,319	33,876	23,226	27,004	16,684

The above figures represent crude oil. 100 hectolitres crude will give from 70 to 75 barrels (25 gallons) refined (non-freezing) oil ready for export.

It will be seen from the above that this year's production of cod-liver oil is 10.320 hectolitres below the average, and 6,542 hectolitres below 1894. The livers in Finmarken being very lean, and the fishing up till date a failure, it is certain that the production of cod-liver oil from that district will not nearly fill the deficiency.

It must be remembered, also, that the enormous production in 1893 left over considerably large stocks to be cleared in 1894, whilst stocks of old oil were very nearly exhausted at the commencement of the present year. —Canad. Drug., 1895, 141.

Aromatic Cod Liver Oil.—Dieterich offers a formula, which is to dissolve $\frac{1}{10}$ part cumarin and 1 part vanillin in a mixture of 50 parts of oil of lemon, 20 parts oil of neroli and 10 parts of English peppermint, using gentle heat, and then mixing this solution with 10,000 parts cod-liver oil. —Chem. and Drug., 1894, 740.

Cod-Liver Oil.—F. Peckel Möller has published a large work on Cod-liver oil and its chemistry. He relates all of the "active principles" which have been isolated, as decomposition products. This work can be

* Nordmore, Sondmore, and all southern districts.

had from W. H. Schieffelin & Co., N. Y., and from A. T Möller & Co., Copenhagen.

Brown Pigment in the Elytra of Curculio cupreus.—A. B. Griffiths obtains the pigment by extraction with boiling alcohol and ether. The product has the composition $C_{15}H_{13}NO$. It is soluble in alcohol, ether, and acetic acid. The solutions are gradually decolorized by light, and on spectroscopic examination do not give characteristic absorption bands. The author names this pigment provisionally cupreine.—Compt. rend., 1895 No. 19; Chem. News, 1895, 270.

Pure Delaware Honey.—L. F. Kebler found samples to contain an excessive amount of chlorides; he takes exceptions to the pharmacopœial test of absolute alcohol for dextrin, alleging that he had not found a single honey in over a hundred samples that would comply with this test.—Amer. Jour. Pharm., 1895, 26.

Honey Dew and its Effect on Bee Honey.—E. von Raumer has examined honey-dew, a sweet sticky deposit on the leaves of various leaves and twigs which is produced by a kind of leaf insect, and reports the results (Zeit. Analyt. Chem., xxxiii. 4, 1894). The honey-dew was collected by pouring water over the leaves, allowing to stand a few minutes, pouring off, clarifying with aluminum hydrate, exaporating the water to a syrup and purifying by repeated treatment with animal charcoal. In 1893 there was an abnormal quantity of honey-dew noted, and the author attributes the large proportion of dextrin observed in the honey of that year to the honey-dew. The results of his investigations indicate that all honey contains some difficultly fermentable dextrin, and that much honey, particularly that obtained from the coniferae or that contaminated with honey-dew contains considerable quantities of unfermentable dextrin.

To Detect Glucose in Honey.—Glucose invariably contains small quantities of dextrin, while honey does not. If a sample of honey is suspected of adulteration with glucose, 1 part of the sample is mixed with 2 parts of water and warmed with 2 per cent. of animal charcoal. Ten C. c. of the colorless liquid are then poured into a test tube and absolute alcohol poured in. If at the zone of contact a turbidity appears, dextrin, and consequently glucose, is indicated.—Amer. Drug. and Pharm. Rec., 1894.

Adulterated Honey.—F. B. Guthrie (Pharm. Jour. Trans. and Pharm. Era, 1895, 334), reporting on several commercial samples of honey obtained in Australia, found that three out of five were adulterated with starch, syrup, or glucose. His conclusions rest on the following facts: Honey consists principally of a mixture of two sugars, dextrose and lævulose, in slightly varying, but nearly equal proportions. As, however, lævulose turns the ray of polarized light nearly twice as far to the left as dextrose does to the right, genuine honey usually exhibits a left-handed rotation. Glucose obtained from starch exhibits a right-handed rotation,

consisting, as it does, of maltose and dextrin. Cane sugar is also dextrorotatory. Maltose does not reduce alkaline solutions of copper so readily as glucose, and dextrin not at all. Consequently, honey that gives a right-handed polarization may be concluded to contain starch, syrup, or cane sugar, and honey containing these adulterants will reduce less than the normal amount of alkaline copper solution than pure honey. If invert sugar were used as an adulterant, the rotation to the left would probably be greater than the normal (and traces of the acids used to invert it would probably be detected), but the higher price of invert sugar prevents its use for that purpose at present.

American Isinglass for Tannin Determinations.—W. T. Wenzell, in Amer. Jour. Pharm., 1894, 447, says that it is obtained from the air bladder of the common hake (Gadus merluccius). This is thrown into water to macerate for a little while, and is then taken out and pressed between two iron rollers, by which it is elongated to the extent of half a yard or more.

In order to prepare this isinglass for the purpose here indicated, it is packed moderately firmly into a conical glass percolator, having its lower orifice corked, covered with distilled water and allowed to stand about twelve hours. Then the cork is removed and the water allowed to drain. The cork is then replaced, more water poured on to cover the isinglass, and the operation repeated about four times or more until the water that drains away is not affected on the addition of a solution of tannic acid. During the warm weather, or if the isinglass should acquire odor indicating putrefactive decomposition, the addition of about 10 per cent. of alcohol to the water will be necessary. The isinglass is then transferred to a muslin strainer, and strongly expressed in order to remove as much of the water as possible. The moist mass is then to be returned to the percolator, covered with stronger alcohol, allowed to stand twelve hours, transferred to the strainer and again expressed. The cake of isinglass is finally spread out by picking it apart, and laid on glass or porcelain plates, and allowed to dry in a current of air.

Salivary Glands of the Leech.—J. M. Croochewit.—It is the secretion of these glands which prevents the coagulation of the blood. Most of the present paper is anatomical. Some observations of a chemical nature seem to indicate that the substance to which the secretion owes the activity alluded to above is a nucleo-albumin.—Tijdschr. d. Md. Dierk. Vereen., 1894, 296; Jour. Chem. Soc., 1895, 53.

Milk Sugar Manufacture.—C. L. Penny (Delaware Experiment Station) has been investigating the manufacture of sugar of milk, with the view of finding a method suitable for employment in the ordinary creamery, which has now become quite an institution in many farming communities. The skim milk is heated in a suitable wooden or tin tank to about 120°F. To this, for each 100 pounds of milk, 1½ pounds of aluminum sulphate is added in the form of a hot solution. The curd precipitates at

once, or in a very few minutes. The clear whey is then separated from the curd by filtering through wire gauze. It is next heated to not less than 180°, and about ¼ pound of powdered chalk to each 100 pounds of milk is added. The excess of aluminum sulphate is precipitated, together with some nitrogenous matter in the whey not precipitated by the first treatment. From this precipitate a perfectly clear filtrate may be obtained, the larger part by simply drawing off, the last portion by filtering through duck filters. This clear juice contains sugar, some sulphate of lime and still a small residue of nitrogenous matter. . . . To prevent foaming, which would greatly retard the work, or cause a loss of much of the sugar, a treatment with ground oak bark, or its extract, has been found thoroughly effective. It is indeed believed to be, if not a necessary part of the process, at least one that will greatly facilitate it and diminish the loss. From three to four pounds of ground bark for every 100 pounds of milk is found to be enough. Instead of the ground bark, from two-fifths to one-half pound of commercial tanner's extract of oak bark is more convenient and equally efficient. Bone-black also attains the same end, but it is not recommended on account of the time, trouble and expense of the treatment. The whey thus purified is boiled in a vacuum pan, just as are sugar juices. The crude, almost black, product is first boiled to prevent moulding, and afterwards purified by being re-dissolved, passed hot over bone-black till it is colorless, and again evaporated to the point of crystallization. The purified sugar must be dried to prevent moulding.—Pharm. Era., 1894, 223.

Resorcin for Testing Milk Sugar.—A. Conrady finds that resorcin is sensitive to cane sugar and glucose, but not to milk sugar, and he therefore gives the following as a means of detecting the presence of cane sugar in milk sugar: If 1 Gm. of milk sugar be dissolved in 1 C.c. of water, and 0.1 Gm. of resorcin and 1 C.c. of hydrochloric acid added, the solution should not turn red after boiling for five minutes. This test will detect the presence of 0.1 per cent. of cane sugar.—Apoth. Zeit., 1894.

Notes on Pepsin Testing.—L. A. Harding (Amer. Drug. and Pharm. Rec., 1895, 101), sums up his experiments as follows:

First. The pepsin employed was claimed by the manufacturers to be able to digest 1 to 2,500. Acid solution employed, strength 0.2 per cent. absolute hydrochloric acid: time of digestion, six hours; temperature, 100° to 104° F.; average amount of albumen digested in five successive trials, 1,540 grains.

Second. Conditions and material the same as in the first instance cited, excepting that *no pepsin* was used; the quantity of albumen digested on an average of six successive trials being 1,260 grains, leaving a difference in favor of the pepsin solution of 280 grains, or practically dissolving only about 9 per cent. of the amount claimed.

He accounts for the difference noted by the hypothesis that the pepsin

converts part of the syntonin formed into a peptone, thus giving the remainder of the syntonin, if any more is formed, a chance to enter into solution, which could not be the case were the solution of syntonin already in a saturated state. The acid solution in this case converts the albumen into syntonin, from which it is converted into a peptone by action of the pepsin. This is the only credit that can be accorded to the pepsin.

Another important factor is the amount of acidulated water used. It must be borne in mind that no more should be used in testing the pepsins than is absolutely necessary. The proper proportion seems to be 1 ounce of acidulated water to 100 grains of albumen. Nearly all authorities, such as Clark, Hirsch, Schneider, Geisler, etc., agree on this amount of acid solution, and so long as we simply aim at the digestion of the albumen we should endeavor to ascertain what quantity of solution is necessary to dissolve a given quantity of albumen, and not what weight of albumen will be digested in an excessive quantity of water. Clarke states (Pharm. Journ. and Trans., January, 1892, p. 597) that the amount of acidulated water used is an important factor; as no limit can be given, to that extent the digestive power of the same pepsin will vary. Of course, Geisler, on the other hand, recommends 100 C.c. of acidulated water for 10 grains of albumen; but he also directed that the digestion be carried on only three hours. There are some who advise the use of nearly double the quantity of solution, but it should be borne in mind that if double the quantity of liquid is used this involves doubling the quantity of acid, and the result should be that double the quantity of pepsin is dissolved.

The whole matter of pepsin testing as practiced at the present time is, it seems to the author, only a delusion, for his claim that albumen is soluble in acid solution, without the aid of pepsin, is based upon actual facts, arrived at through actual work. The time will come, when we shall go a step further and gauge the value of a pepsin by the amount of peptone it is able to produce, and not by the quantity of albumen there is dissolved in acid media of which it happens to be a part.

Loaded Sponges.—According to the Oil, Paint and Drug Reporter, the rise in price of the various kinds of Florida sponges has given rise to an ingenious method of artificial weighting. Formerly lime and sand were employed for this purpose; now it is stated glycerin and solution of silicate of sodium are used, the latter being selected for its admirable weighting properties and the ease with which it can be manipulated. One sample when tested showed a loading of about 25 per cent. of this substance.—Pharm. Jour. Trans., 1895, 1092.

Chemistry of the Thyroid Gland.—C. Schaerges, in a preliminary communication, states his conviction from experiments made that the thyroid gland contains a considerable proportion of lecithin, the presence of which he regards as having an important relation to the physiological action of the gland.—Pharm. Zeit., 1895, 314.

CHEMISTRY (INORGANIC) AND PHYSICS.

Compact Portable Battery.—What is probably the smallest, lightest and most compact practicable galvanic cell made is the Capo-Farad Battery, which yields a current of 2 amperes at a voltage of 1.1. It consists of a zinc cell $\frac{1}{16}$ inch in diameter and $2\frac{3}{4}$ inches long, closed with a hard rubber stopper, and containing an electrode of fused silver chloride cast upon a zigzag silver wire, one end of which extends through a stuffing box in the cover and forms one pole of the battery. The zinc cylinder forms the other pole. Hard rubber discs hold in position the silver chloride rod, which is enclosed in textile material, while the space between it and the zinc is filled with fibrous material saturated with the electrolytic liquid used. A four-cell battery with case weighs but five ounces, and is capable of performing useful work.—Scient. Amer., lxxii., 43 ; Pharm. Jour. Trans., 1895, 646.

The Voltaic Chain.—H. M. Goodwin describes experiments made to test the validity of the law, that the potential difference between a metal and a solution depends on two constants : (1) a constant for the metal ; (2) the cathion concentration of the solution. Two cases are considered : when the solution is (1) that of a salt of the electrode, (2) that of a sparingly soluble salt of the electrode in the presence of a soluble salt containing the same anion. The cause of the difference of potential is considered to be the emanation of ions from the metal into the solution until the ion pressure (p), together with the electro-static attraction of the metal for the ions—f(s)—, is equal to a value P, constant for the metal.—Zeit. f. physikal. Chem., 1894, 577.

Electrolysis and Polarization of Mixtures of Salts.—L. Houllevigue.—According to Buff, when a mixture of two salts is electrolyzed there is always a fixed ratio between the amounts of each decomposed by the current, and this ratio is independent of the strength of the current used. In a former paper the author has shown that Buff's law is not strictly true, but is complicated by the probable occurrence of secondary actions, and, further, that if the secondary action is supposed to be proportional to the time, the ratio should be a hyperbolic function of the intensity of the current. In the present paper it is shown that in the electrolysis of mixtures of zinc and copper sulphates the ratio Zn : Cu deposited does actually increase with the current and is a hyperbolic function of the intensity. Buff's law is, therefore, only approximately true when the intensity of the current is sufficiently great.—Ann. Chim. Phys., 1894, 351 ; Jour. Chem. Soc., 1894, 406.

Floating Metallic Films by Electrolysis.—Formation of.—F. Mylius and O. Fromm.—During the electrolysis of a concentrated zinc sulphate solution, it was observed that the cathode wire became surrounded by a film of metallic zinc floating upon the surface of the solution, the film increasing gradually to a considerable size. A somewhat similar observation has been made by F. Kohlrausch in the case of the electrolysis of a solution of silver chloride in ammonia, and the authors have therefore been led to study the conditions under which the formation of such films takes place. Experiments made with zinc sulphate and ammoniacal silver chloride show that the two principal necessary conditions are an impure state of the surface of the solution and the presence of oxygen in the atmosphere above the solution. If the surface is perfectly clean, formation of a film is not observed, whilst on the other hand, the addition of the smallest trace of any oily impurity such as turpentine, which will float upon the surface, favors the film formation. If the air above the liquid is replaced by hydrogen, carbonic anhydride, or nitrogen, the film is not formed. Observations with both the zinc and silver films point to the presence of some trace of oxidized metal in the film, and if the surface of the solution is covered with an oil that has been completely freed from dissolved oxygen, the film is not formed. In other cases, the formation of a film below the surface of the liquid, as at the boundary between the solution and a heavy liquid like chloroform, is possible. Films were also obtained from copper, cadmium, cobalt, iron and antimony solutions.

When the copper solution is treated with a solution of sulphur, in a mixture of benzene and carbon bisulphide, the surface film consists chiefly of cuprous sulphide, and a solution of iodine in benzene on the surface of silver sulphate gives rise to the formation of a silver iodide film.—Ann. Phys. Chem., Jour. Chem. Soc., 1894, 267.

Magnesium Voltaic Cell.—H. N. Warren suggests the substitution of magnesium for the zinc rod in the Daniel's voltaic cell, on account of its greater reducing action, and the use of cupric chloride instead of cupric sulphate in the outer vessel, because of its greater solubility in water, and the possibility of making the solution so as to offer less resistance. This solution should be rendered strongly acid by means of hydrochloric acid, and will be very slowly decomposed. The porous pot should be charged with a strong solution of ammonium chloride, which dissolves the magnesium uniformly, forming a double chloride, and at the same time prevents local action. With these modifications it is said a voltaic arrangement may be constructed giving a voltage equal to a nitric acid battery or bichromate cell (Chem. News, lxx., 179.)

Expenditure of Energy Equivalent to the Chemical Action of Light.—L. Lemoine. In studying the action of oxalic acid on ferric salts, no account was taken of the possible influences of light on the course of the reaction. It has now been ascertained, experimentally, that this influence is practi-

cally inappreciable and that light probably plays no part beyond that of aiding in inducing the reaction in question.—Compt. rend., 1894, 525.

Endothermic Reactions effected by Mechanical Force.—W. Spring. Carey Lea ignores the author's work where he claims that, before himself, no one had accomplished the conversion of mechanical into chemical energy. Eleven years ago the author expressely wrote, "The facts to which I have just called attention prove conclusively that it is possible to cause substances to react chemically by means of mechanical energy alone."—Zeit. f. Anorg. Chem. 1894, 176.

An Electrode Sensitive to Light.—H. Luggin describes a form of electrode considerably more sensitive to light than any employed by previous investigators, and gives a few details of its construction. It consists of a platnium plate covered with bromide of silver, and, when used, is paired with a similarly coated silver electrode, in a decinormal solution of potassium bromide.—Zeit. f. physical Chem., 1894, 385.

Polarization of a Thin Metal Partition in a Voltameter.—J. Daniel.—When a thin metal partition is introduced between the poles of a voltameter, gases are evolved at its surface; but if the thickness of the partition is below a certain limit, the current passes without evolution of gas and without evident polarization. The author finds that the "critical thickness," that is, the least thickness of partition through which the current passes without polarization, is 0.00009 Mm. for gold, 0.00015 Mm. for platinum, and 0.0005 Mm. for aluminum, with a small current and a good conducting electrolyte. The "upper critical limit," that is, the smallest thickness for which the polarization is the same as for very thick plates, is about 0.004 Mm. under the above conditions. Between the critical limits, the polarization increases with the thickness.

Special experiments indicated that in the case of copper sulphate solution, the passage of the current was not accompanied by the passage of copper ions through the gold-leaf partition, but rather that the copper sulphate itself diffused bodily through the membrane.—Phil. Mag., 1894, 785.

General.

Principles of a New System of the Elements.—J. Traube has shown that certain simple relationships exist between the atomic volumes of similar elements. In place of regarding the properties of the elements as functions of their atomic masses, he proposes an arrangement in which the atomic volumes are the determining factors. Similar elements then appear in groups having equal atomic volumes, or in which there are equal differences between the atomic volumes of allied elements.—Ber. d. Chem. Ges., 1894, 3179.

Influence of Low Temperatures on the Laws of Crystallization.—R. Pictet.—All substances cooled below 70° become diathermanous, this

characteristic becoming more marked the lower the temperature to which they are cooled. In this behavior, there is an explanation for the fact that a temperature of 68.5° may be observed in liquid chloroform from which crystals are separating at 83°, and when the temperature of the surroundings is 120° to 130°. To obtain the true temperature of crystallization below—50° it is necessary to avoid super cooling, and to allow the crystallization to take place very gradually.—Compt. rend., 1894, 554.

Phases and Conditions of Chemical Change.—V. H. Valey distinguishes four stages through which chemical action passes, viz., (1) a period of commencement, (2) of inertness or reluctance, followed by acceleration, (3) of constancy, (4) of diminution of velocity; and gives examples illustrating this division. He then proceeds to discuss the nature of chemical change, and the cause of its commencement, criticising adversely Armstrong's reversed electrolysis theory, Arrhenius' theory of electrolytic dissociation, and the notion of nascent action.—Phil. Mag., 1894, 165.

The Critical State.—W. Ramsay contends against the supposition that at the critical temperature the liquid and gas possess distinct individuality, and describes the method he adopts for obtaining pure ether at its critical temperature, complete details being given, as absolute purity is a matter of vital importance. The ether, contained in a ring-shaped tube, is heated by the vapor of pure quinoline in a jacket connected with a reservoir and pump so that the temperature can be accurately altered to a small fraction of a degree. At about 193.5° the surface of the ether becomes nebulous, and at this point a slight cooling of the one side of the jacket causes a sinking of the substance at that side, and a corresponding rise in the other, owing to the great expansibility in the neighborhood of the critical temperature; by further cooling a complete circulation of the ether may be effected. The appearance of streaks, usually taken as a sign of the critical state, is no indication, as the nebulosity, when examined by a polariscope, shows the presence of liquid particles suspended in the gas like a cloud. The critical point can, however, be found from two density observations taken at two neighboring points, the curve being considered a parabola. The critical point of ether, he hence concludes, is 194.7 or 194.8, and he emphasises his opinion that at this temperature the substance is completely homogeneous.—Zeit. f. physikal. Chem., 1894, 486.

Effects of Pressure on Chemicals.—Some remarkable results obtained by Lea, in subjecting salts of various substances to great pressure in a powerful screw vise, have led to conclusions not heretofore recorded in chemical investigations. The area treated was about one-eighth of a square inch, and the pressure treated was in the proportion of over a million pounds to the square inch, or about seventy thousand atmospheres—these, of course, being calculated pressure, subject to considerable reduction for friction. Certain salts of iron, silver, potassium, platinum, mercury, when subjected

to the pressure, were visibly affected, the color being changed. The opinion, therefore, expressed by Lea, is that many of the salts of easily reducible metals, especially of silver, mercury, and platinum, undergo reduction by pressure; and as such reductions are endothermic, it consequently follows that mechanical force can bring about reactions which require expenditure of energy, which latter is supplied by mechanical force in the same way that light, heat, and electricity supply energy in the endothermic changes which they bring about.—Amer. Drug. and Pharm. Rec., 1894.

Relation between Depression of the Freezing Point and Osmotic Pressure of Solutions.—C. Dieterici. In answer to Arrhenius, the author admits the greater accuracy of Juhlin's observations on the vapor pressure of ice and water at temperatures below o° as compared with those of Fischer, but still maintains that no strict proportionality exists between the depression of the freezing point and the osmotic pressure of solutions. The theoretical relationship existing between these two quantities is deduced, and it is shown that the assumption hitherto made, that the heat of dilution of dilute solutions is so small that it may be neglected, is incorrect.—Ann. Phys. Chem., 1894, 263.

Solubility of Mixed Crystals of Pairs of Isomorphous Salts.—W. Muthmann and O. Kuntze have examined the equilibrium between solid solutions of several pairs of isomorphous salts and their aqueous solutions. The equilibrium between potassium dihydrogen arsenate and phosphate at 7° is typical of case 1 of Roozebrom's classification, a case not hitherto met with in practice. The curve connecting the composition of the mixed crystals with that of their solution is only slightly above the straight line making 45° with each co-ordinate, that is to say, the composition of the solution differs but slightly from that of the deposited crystals. The equilibrium between potassium perchloride and permanganate and their mixed solutions at 7° is of the same kind as that between the potassium and thallium chlorates and their solution; the same is true of potassium and rubidium permanganate.—Zeit. Kryst. Min., 1894, 368: Jour. Chem. Soc., 1895, 7.

Lowering of the Freezing Point.—H. Z. Jones' results of the determinations of the reduction of the freezing point are not concordant with those of Loomis, and suggestions of possible errors in the author's results were made by Kohlrausch. These, however, do not appear to be the true cause of the difference, and suggestion is made of possible impurity in some of Loomis' compounds. The author's results in the case of phosphoric acid are shown to agree well with those of Arrhenius, whilst the results of Loomis differ by as much as 25 per cent. The "dissociation," as calculated from the author's numbers, also agrees in most cases with that obtained by Kohlrausch by the conductivity method.—Ann. Phys. Chem., 1894, 392.

Influence of Moisture on Chemical Change.—H. B. Baker finds that SO_3

does not combine with dry lime or dry copper oxide. Dried ammonium chloride may be sublimed from a mixture of the salt with dried lime without ammonia being evolved. Dried H and Cl may be exposed to sunlight for two days without anything like complete interaction taking place. Purified and dried nitric oxide and dried oxygen do not interact. HCl when dried does not combine with dried ammonia gas. Dried NH_4Cl does not dissociate when heated to 350°. Nitrate of lead decomposes when dried and the fumes darken on heating. The combustion of CS_2 in dried oxygen is probably due to the previous splitting up of the substance when heated. Dried $KClO_3$ and silver oxide decompose on heating, giving off ordinary oxygen. Ozone is produced by the electrification of dried oxygen. Dried ammonia and hydrogen chloride can be partially separated from a mixture of these gases when oppositely charged plates are placed in the mixture, the ammonia passing to the negative plate and hydrogen chloride to the positive. Two tension electric discharges do not pass in dried gases unless a strong discharge has been previously sent through them. —Jour. Chem. Soc., 1894, 611.

Analytical Chemistry.

New Applications of Alkalimetry and Acidimetry, F. Hundeshagen.—Estimation of the hardness of water. The reagents wanted are a solution of 3.786 Gm. of sodium carbonate in 1 litre of water and dilute nitric or hydrochloric acid of corresponding strength. 200 Cc. of the sample is titrated directly with this acid, tincture of cochineal serving as indicator. Each Cc. of acid shows 1° of temporary hardness. The permanent hardness is estimated as follows: 200 Cc. of the sample is mixed with a moderate excess of the sodium carbonate solution, evaporated to dryness, and the residue, after being moistened with a little water, is once more evaporated and heated to about 200°. It is now dissolved in a little water, the liquid filtered, and the insoluble matter washed with about 50 Cc. of water. The filtrate is then titrated as before. The number of Cc. of acid deducted from the Cc. of added soda represents the permanent hardness. The total hardness may be estimated directly by using the resulting liquid from the estimation of the temporary hardness for the determination of the permanent hardness.—Chem. Zeit., 1894, 505.

Quantitative Analysis of Electrolysis.—A. Classen.—A description is given, accompanied by plans and a sketch, of the manner in which the private laboratory, and a bench in the inorganic laboratory, are fitted up for electrolysis at Aix-la-Chapelle.—Ber. d. Chem. Ges., 1894, 2060.

Copper Electrolysis in a Vacuum.—W. Gannon shows that with two copper voltameters containing freshly made neutral solution of copper sulphate, one of which is under reduced pressure, the other conditions being comparable, the copper deposit in the partial vacuum is higher than the deposit under the atmospheric pressure, but the percentage difference

is not constant. If a little free sulphuric acid be added to the air solution, the percentage difference is more constant and higher than before. The addition of acid to both voltameters causes the percentage difference to be constant within experimental errors. Under this last condition, for current densities above 0.01 ampére per sq. Cm. of active cathode, there is no practical difference between the two deposits, but for densities below 0.01 ampére per sq. Cm., the vacuum deposit is very appreciably higher than the air deposit. A curve drawn representing the deposits obtained in a vacuum at different current densities is more regular than the air curves, and for densities below 0.01 ampére per sq. Cm. is approximately a straight line.—Proc. Roy. Soc., 1894, 66.

Estimation of Alkali Hydroxides and Carbonates in the Presence of Alkali Cyanides.—J. E. Clennell.—These estimations may be effected by titrating the cyanide directly with silver nitrate; then, in the same solution, with phenolphthalein as indicator, estimating the hydroxide and half the carbonate by titrating with hydrochloric acid. The total alkali is titrated directly with hydrochloric acid, using methyl-orange as indicator, the alkalinity due to the cyanide, hydroxide and carbonate, respectively, being calculated from these numbers.—Chem. News, 1895, 93.

Estimation of Carbonates and Caustic Alkalis in Mixtures.—P. L. Aslanoglon.—Titrating total alkalinity with $\frac{N}{10}$ sulphuric acid, with methyl-orange as indicator, and then the alkalinity due to hydroxide with phenophthalein as indicator, gives erroneous results. Therefore, in place of the second titration the author suggests estimating the carbonic anhydride in a Schrötter's apparatus, using methyl-orange to indicate the end of the action; he has obtained good results. Hydrochloric acid, or nitric acid distilled from urea nitrate, and not sulphuric acid, should be used for expelling the carbonic anhydride.—Chem. News, 1894, 166.

Estimation of Carbonates and Caustic Alkalis in Mixtures.—C. A. Seyler. Phenolphthalein, although not to be highly recommended as an indicator for the estimation of carbonates in presence of hydroxides, is capable of giving accurate results, if precautions are taken to prevent any loss of carbonic anhydride.—Chem. News, 1894, 187.

Apparatus for the estimation of Carbonic Anhydride.—A. C. Christomanos. The apparatus described by the author is a modification of Bunsen's well-known apparatus, sulphuric acid being substituted for calcium chloride as the drying agent, and a more stable form given to the whole.—Ber. d. Chem. Ges. 1894, 2748.

Test for Chlorides.—Villiers and Fayolle find that a still more delicate test than the one they recently proposed for chlorides consists in substituting orthotoluidin for the aniline previously recommended. A sharp reaction is then obtained with less than $\frac{1}{10}$ Mgm. of chlorine, a fine blue coloration resulting, and changing to a reddish-violet on the application of

heat or cold. The reaction is, however, not sharply defined from that given by bromides under similar conditions, unless aniline also be present. The following formula is therefore given for the reagent:—Colorless, saturated, aqueous solution of aniline, 100 Cc.; saturated, aqueous solution of orthotoluidin, 20 Cc; glacial acetic acid, 30 Cc. On using this reagent, any bromides and iodidis present are acted upon by the aniline, forming white or colorless compounds, and the action of the orthotoluidin on the chlorides present is not obscured.—Pharm. Jour. Trans., 1894, 71; from Comp. rend., cxviii, 1413.

Estimation of Chlorides in Products of Organic Origin.—G. Mulliere.—When chlorine has to be estimated in organic products, it is necessary to burn off the organic matter, but this always causes an appreciable loss of chlorine. The author recommends the filtering process: The substance (urine for instance) is mixed with an equal bulk of 20 per cent. solution of calcium nitrate and evaporated to dryness in a flat-bottomed platinum dish; a slight elevation of temperature suffices to completely burn off the carbonaceous matter. The residue, when treated with water, yields a filtrate which is free from phosphates; to this a drop of solution of tropæolin is added, and then dilute sulphuric acid to acid reaction. A little powdered chalk is now added to decolorize the liquid, and the chlorine is titrated with silver nitrate, using potassium chromate as indicator. It is advisable to make a blank experiment.—Jour. Pharm. Chim., 1894, 497.

Detection and Estimation of Chlorine in Presence of Iodine.—P. M. Raikow.—Phenylhydrazine is dissolved in dilute sulphuric acid and mixed with an excess of copper sulphate. If sufficient acid is present, he mixture will remain clear. Added to a soluble chloride containing an iodide, the latter causes a bulky, brownish precipitate containing all the iodine. Chlorine may then be tested for in the filtrate by adding silver sulphate. The precipitate will yield its iodine to boiling aqueous potash, which may then be qualitatively or quantitatively estimated as usual. Bromides also give a precipitate with the reagent, but too soluble to admit of quantitative estimation. It cannot, however, be separated from the iodine compound by simple washing.—Chem. Zeit., 1894, 1661.

Separation of Chlorine and Bromine.—The separation of chlorine and bromine from mixtures of chlorides and bromides is said to have been satisfactorily effected by R. Engel (Chem. News, 1894, lxx, p. 31), by the action of ammonium persulphate, which decomposes the bromides and sets the bromine at liberty, without affecting the chlorides. He proceeds as follows: Dissolve from 1 to 2 Gm. of the mixture of alkali chloride and bromide in from 150 to 200 Cc. of water, and add to the solution from 3 to 5 Gm. of ammonium persulphate. The mixture is heated to 70 or 80° C., and a current of air is passed into the liquid, which carries away all the bromine. The operation requires about an hour, and the

separation is stated to be theoretically perfect. The bromine is collected in a dilute solution of sulphurous acid, and it is determined either in the state of silver bromide or, after destroying the excess of sulphurous acid and neutralizing the liquid, by standard silver nitrate, using potassium chromate as indicator. It is better to collect the bromine in a dilute solution of sulphurous acid rather than in a solution of potassium iodide, because the decomposition of ammonium persulphate by heat liberates oxygen containing traces of ozone or perhaps persulphuric anhydride, according to Berthelot, which reacts upon potassium iodide. The quantity of iodine liberated in an hour under this influence may reach to 0.006 or 0.007 Gm. If under the conditions indicated above ammonium persulphate is caused to act upon pure commercial sodium chloride, and if the current of air which traverses the solutions is directed into washing bottles containing silver nitrate, we observe after about fifteen minutes a slight turbidity in the nitrate of silver. This turbidity, compared to that produced by sodium chloride in the same volume of silver nitrate, corresponds, it is reported, to some hundredths, but not as much as one-tenth, of a milligramme of the former salt. Ammonium persulphate may likewise serve for separating the iodine of the iodides in presence of chlorides and bromides. In the cold and in the presence of sodium acetate, all the iodine of the iodides is precipitated by the persulphate without setting free the smallest trace of bromine or of chlorine. But the iodine cannot be separated by heat, as there is then formed, in fact, a certain quantity of iodic acid. It is necessary, therefore, to operate in the cold—separating the iodine by means of carbon disulphide, and titrating with sodium thiosulphate.

Action of Formic Aldehyde upon Ammoniacal Salts.—A. Brochet and R. Cambier study the action of ammonium hydrochloride, both in the cold and in the heat. They infer that there exists between ammonia and hexamethyleneamine one or more bases serving as intermediate terms. They are not isolable, but they have been able to demonstrate their existence by the acidimetric study of the solutions, and by fixing these bases in insoluble compounds, such as chloroplatinates or nitroso-derivatives. The other ammoniacal salts give with formaldehyde similar results.—Compt. rend., Vol. cxx., No. 10.

Triammonium Orthophosphate and the Qualitative Detection of Magnesium.—P. Schottländer.—If in testing a solution for magnesium we use ordinary ammonium phosphate (1 :10) instead of sodium phosphate, we may, in the total absence of magnesium, obtain a finely crystalline precipitate which is deceptively similar to magnesium-ammonium phosphate, and may thus easily lead to error. This is especially the case if such substances as ammonium chloride and strong ammonia have been added, additions well known for promoting the separation of magaesium.—Zeit. f. Anorg. Chem., Vol. vii., part 5.

Alkalimetric Determination of Magnesium and Calcium.—According to Hundeshagen's method (Chem. Ztg., xviii., 445, 505 and 547) these earths are precipitated as phosphites, and after freeing from other salts by washing, the mixture of $MgNH_4PO_4$ and $Ca_3(PO_4)_2$ is dissolved in a measured amount of standard hydrochloric acid. Then a measured excess of standard soda solution is added, and the ammonia distilled off, which gives the measure for magnesium present. Now on adding methyl orange (or cochineal) and titrating back with standard hydrochloric acid, the neutral point is where the $CaH_4(PO_4)_2$ and $MgH_4(PO_4)_2$ are formed. Allowing for the magnesium compound, the amount of calcium present may be calculated. If ammonium phosphomolybdate is suspended in water, and titrated with normal potassa solution, using phenolphthalein as indicator, 1 Cc. of normal potassa solution = 0.003077 P_2O_5.

Kjeldahl's Process for the Determination of Nitrogen.—B. Dyer employed the following method: A weighed quantity of the compound, varying from 0.2 Gm. to 10 Gm., is placed in a round-bottomed glass flask, made preferably of Jena glass, and about 20 Cc. of strong sulphuric acid and a drop of mercury are then added. After gently warming, about 10 Gm. of potassium sulphate is added, and the contents of the flask heated till the liquid is water white, during which process a large quantity of sulphur dioxide is given off. The liquid after cooling is then transferred to a large flask fitted with a rubber stopper with two perforations, in one of which is inserted an ordinary tap-funnel, and in the other the extremity of a long tube of block tin, which is bent twice at right-angles, and acts as a condenser. To the acid liquid excess of alkali is now added, and the whole boiled for half an hour, when the ammonia distils over through the tin tube, and is received into an Erlenmeyer flask containing standard acid, which is titrated in the usual manner. When mercury is used in addition to sulphuric acid, a little potassium sulphide is added, as well as a little zinc foil to prevent bumping. Blank experiments are always first made with sugar, and the error of experiment allowed for in subsequent determinations. When nitrates are thus analyzed it is necessary to add phenol or salicylic acid to the substance, next the sulphuric acid, and lastly about 2 Gm. of zinc. The whole is then allowed to stand till action has ceased.—Pharm. Jour. Trans., 1895, 1099.

New Gasometric Method of Estimating Nitrogen in Nitrates.—Fr. Gantter employs the gas volumeter formerly described, but with the introduction, between the tubes of the reaction flask, of a special absorption vessel containing soda to arrest hydrogen chloride. To avoid calculation, 289 Mgm. of the substance is used; 5 Cc. of water expelled from the apparatus then corresponds with 1 per cent. of nitrogen as nitric acid. This quantity contained in 3 Cc. of solution, is placed in the reaction flask with 0.5 Gm. each of crystallized ammonium chloride and crystallized phosphorous acid, and 2 Cc. of sulphuric acid (2 vols. of concentrated acid

with 1 vol. of water). In the pipette is placed 5 Cc. of the same acid. After equalizing the temperature, the reaction flask is very slowly and carefully warmed. Should the mixture become yellow, or red fumes be evolved owing to too rapid heating, the results are inaccurate. When evolution of gas ceases, the additional sulphuric acid is slowly dropped in, and the mixture is finally raised to boiling and boiled vigorously for a few minutes, but not so long as to produce a brown color from the concentration of the sulphuric acid. The method is very suitable for estimating nitrates in natural waters, and the test analyses with pure substances gave very favorable results.—Zeit. f. anal. Chem., 1895, 25.

A Wet Method for Estimating Nitrogen in Nitrates and in Nitro and Nitroso Compounds.—M. Krüger.—0.2–0.3 Gm. of the substance to be analyzed is to be mixed with 20 Cc. of water (or alcohol, if it is insoluble in water), 10 Cc. of a strongly acid solution of stannous chloride in hydrochloric acid, and 1.5 Gm. of tin, best obtained by precipitating a solution of stannous chloride with zinc. The mixture is heated with a small flame until all color has disappeared and the tin is entirely dissolved. It is then cooled (or if alcohol, evaporated), treated with 20 Cc. of strong sulphuric acid, and heated until copious fumes of sulphuric acid are evolved. In the case of a nitrate, it is now only necessary to make the solution alkaline, and distil off the ammonia; in the case of a nitro- or nitroso-compound, an amido-derivative will now be present, and this must first be oxidized. The results are accurate. If the substance is volatile with steam in acid solution it must be heated very gently on the water-bath with the tin and stannous chloride until the reduction is complete. It is even better to carry out the reduction in a sealed tube at 100°.—Ber. d. Chem. Ges., 1894, 1633.

New Process of Estimating Potassium.—H. Schweitzer and E. Lungwitz use the following process when analyzing potash mixtures containing much sulphate; for instance, kainite, superphosphates, etc. The substance is dissolved in water and mixed with an excess of solution of barium oxalate in hydrochloric acid to precipitate the sulphuric acid. After boiling, any iron is oxidized by means of a few drops of hydrogen peroxide, and the iron, calcium, and aluminum, together with any phosphoric acid, and also the excess of barium oxalate, is precipitated by ammonia. The filtrate is evaporated, the residue calcined, and the potassium estimated by means of a platinic chloride, as usual.—Chem. Zeit., 1894, 1320.

Action of Ferric Sulphate on Potassium Iodide and Hydriodic Acid.—K. Seubert and R. Rohrer.—The action between ferric sulphate and potassium and hydrogen iodides takes place in a manner very similar to that described by Seubert and Rohrer for ferric chloride. The reaction with one equivalent of ferric sulphate, $\frac{1}{2}\ Fe(SO_4)_3$, and varying proportions of potassium iodide, approaches the theoretical when 20 mols. of potassium

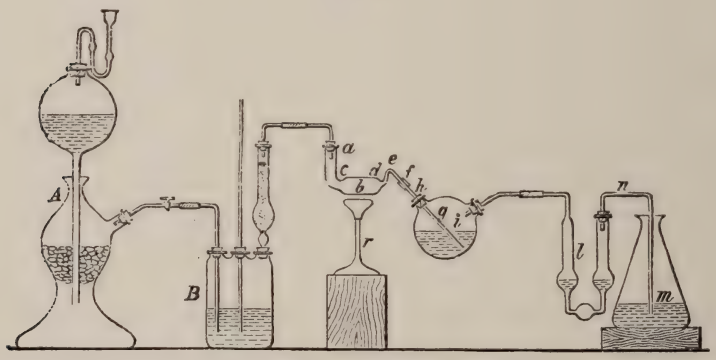
iodide are present. The yield is then 97 per cent., and any further increase in the proportion of potassium iodide produces no increase in the amount of free iodine. When the results are compared with those obtained with ferric chloride, it is evident that the action is much slower, and for small excess of potassium iodine is never so complete. The results obtained with the proportion $FeCl_3$: KI correspond with those obtained with the proportion $Fe_2(SO_4)_3$: 4KI. When the action is allowed to proceed for 18 hours, using an equivalent of ferric sulphate, and varying proportions of potassium iodide, the amount of iodine liberated is at first much less than the amount liberated when ferric chloride is used, but the difference becomes small for 6 mols. KI, and disappears for 10 mols. With 1 mol. of potassium iodide and varying proportions of ferric sulphate, the action is also much slower than with ferric chloride ; and the numbers obtained with the proportions 2KI : 4 $Fe_2(SO_4)_3$ and 2KI : 10Fe $(SO_4)_3$ agree with those obtained for the proportions KI : Fe Cl_3 and KI : 2 Fe Cl_3 respectively. The action between ferric sulphate and hydrogen iodide is also slower and less complete than that between ferric chloride and hydrogen iodide. It is evident that the reaction $Fe_2(SO_4)_3 + 2KI = 2Fe\,SO_4 + K_2(SO_4) + I_2$ is a reversible one when none of the products are removed from the sphere of action. And experiments with mixtures containing various molecular proportions of ferrous sulphate, potassium iodide, iodine, and potassium sulphate, after remaining 144 hours, always contained an amount of iodine corresponding with that liberated by an equivalent mixture of ferric sulphate and potassium iodide.—Zeit. f. Anorg. Chem., 1894, 137.

Action of Ferric Acetate on Potassium Iodide and Hydrogen Iodide.—K. Seubert and R. Rohrer.—Ferric acetate and potassium iodide do not react with liberation of iodine, either in neutral solution or in the presence of a large excess of acetic acid. If, however, hydrochloric or sulphuric acid is added to the mixture, iodine is set free, and when the ratio of acid to the ferric acetate is 3 equivalents to 1 equivalent, the quantity of iodine liberated is equal to that liberated by an equivalent quantity of ferric chloride or sulphate. Ferric acetate liberates iodine from hydrogen iodide, but when the proportions employed are 1 mol. hydrogen iodide and 1 equivalent of ferric acetate, the quantity of iodine liberated is considerably less than in the case of ferric chloride and ferric sulphate. When 10 mols. of hydrogen iodide are employed for 1 equivalent of ferric salt, 99 per cent. of the theoretical amount of iodine is liberated in all three cases. The addition of hydrochloric or sulphuric acid to the mixture $Fe(C_2H_3O_2)_3$: HI, increases the amount of iodine liberated until it nearly approaches the amount liberated in the case of ferric chloride and sulphate.—Zeit. f. anorg. Chem., 1894, 393.

Estimation of Sulphur in Sulphides, and Simultaneous Estimation of the Arsenic Present—P. Jannasch.—The apparatus used is figured below. *A*

is an apparatus for generating hydrogen chloride; *B* contains sulphuric acid, and has a calcium chloride tube attached; the vessel *a*, *c*, *b*, *d*, *e*, *f*, is of hard glass; *h* is a round glass joint; *i* contains 3 per cent. aqueous hydrogen peroxide, with some strong nitric acid added; *l* and *m*, the same mixture, diluted with an equal volume of water. About 0.6 Gm. of the finely powdered mineral is placed in the vessel *a*, *f*, and first heated with a flat-flame Bunsen burner for about half an hour in a current of dry oxygen; the sulphur and most of the arsenic are oxidized and carried over. The oxygen apparatus is then disconnected, and replaced by *A*, *B*; and *a*, *f* is immersed in boiling water, while a rapid current of hydrogen chloride is passed through for 1½–2 hours. The contents *i*, *l* and *m* are now mixed and concentrated to 20–25 Cc., small quantities of strong nitric acid being added from time to time. The residue is diluted to 200 Cc., the sulphuric acid precipitated with a very

Fig. 60.



slight excess of barium chloride, and the barium sulphate collected and weighed. The excess of barium in the filtrate is precipitated with a very slight excess of sulphuric acid. The filtered solution is evaporated to a small bulk, and made alkaline with ammonia, and the arsenic is then precipitated with a slight excess of magnesium chloride, the precipitate being treated as described in Jour. Chem. Soc. (Abstr.), 1892, 658.—Zeit. f. anorg. Chem, 1894, 303.

Decomposition of Sulphates by Ammonium Chloride—Chikashigé.—It is observed that when a mixture of magnesium or sodium chloride with ammonium chloride, ammonia and a very little sulphuric acid is evaporated and heated sufficiently strongly to expel the ammonium salts, some sulphuric acid still remains in the residue; this must be taken into consideration in analytical operations, involving such treatment.—Chem. News, 1895, 17.

Procedure in Fehling's Titration.—A. Bornträger.—Of the two methods of procedure studied by Soxhlet, many text books and official prescriptions

adopt that in which undiluted Fehling's solution and a sugar solution of 0.5–1 per cent. are employed. This involves the use of at least 50 Cc. of Fehling's solution for each titration, and the evaporation of weaker sugar solutions. Good results can be obtained by the use of only 10 Cc. of the copper solution diluted with four volumes of water, and, since the water may be derived from the sugar solution itself, this method permits the employment without concentration of sugar solutions of only 0.1 per cent., such as occur in the analysis of fully fermented wines. The mixture should in any case have a total volume of 55–60 Cc. A flask is to be preferred to a basin. In the preliminary titrations, in which the color of the supernatant liquid is used as a guide, the flask should rest on a white ground, and the sugar solution may be added to the hot copper solution, but the final results should be deduced from the mean of the two titrations, differing by only 0.1 Cc., in which the mixtures are made in the cold, and, after boiling for exactly two minutes and filtering, one filtrate gives a brown color with acetic acid and ferrocyanide whilst the other does not. A thick paper, or else double or triple, should be used to obtain a filtrate perfectly free from cuprous oxide; only a few Cc. of the filtrate should be collected, and the greatest rapidity is essential in order to entirely avoid reoxidation of the precipitate. Sugar solutions of more than 1 per cent. must be diluted to that strength before filling the burette, otherwise errors of reading influence the result too greatly. The copper solution and alkaline tartrate should be preserved separately, and if the tartrate solution is filtered before adding the alkali, it remains unaltered longer. The results should always be expressed in terms of "invert sugar," of which, according to Soxhlet's determination, 10.31 Cc. of a 0.5 per cent. strength reduce exactly 10 Cc. of normal Fehling's solution. Working as above, the use of a sugar solution of only 0.05 per cent. leads to an error not exceeding 4–5 per cent. of the whole amount.—Zeit. f. anal. Chem., 1895, 19.

Direct Volumetric Analyses by means of Sulphurous Acid.—D. Vitali.—In the estimation of mercuric chloride, the liquid, which must be neutral, is heated with sulphurous acid to 70–80° to precipitate the mercury as mercurous chloride. After filtering, the excess of sulphurous acid is expelled by heating to 60–80°, and the liberated hydrochloric acid is titrated with $\frac{N}{10}$ soda and phenolphthalein. 1 mol. of hydrogen chloride = 1 mol. of mercuric chloride. In the estimation of copper sulphate, a solution of copper sulphate is mixed with excess of potassium iodide, and after adding some starch solution, sulphurous acid is slowly added until the liquid is just decolorized. The liberated sulphuric acid is then titrated with $\frac{N}{10}$ soda and phenolphthalein. 1 Cc. of soda = 0.012469 of crystallized copper sulphate. Sulphurous acid may, in turn, be estimated by means of copper sulphate.—Chem. Centr., 1894, 175.

Sensitiveness of Zone Reactions and Their Use in Testing for Acids.—H. Frey.—To avoid the troublesome neutralization required for the qualita-

tive detection of certain acids by silver, barium, or calcium, the author prefers the method of superposing an excess of the neutralizing reagent upon the solution to be tested, and observing only the zone of contact. The usual solution, containing no other metals than those of the alkalies, is acidified with nitric acid. Then to test for phosphoric, arsenic, arsenous, chromic, oxalic, boric, sulphurous, thio-sulphuric, or silicic acids, an excess of silver nitrate is added, and any precipitate produced is removed by filtering. The perfectly clear filtrate is then carefully covered with a layer of ammonia, when any of the above acids will afford a turbidity at the zone of contact. Another portion is treated with hydrochloric acid and barium chloride, some calcium chloride is added to the filtrate, and then a layer of sodium acetate. Here chromic, oxalic, and hydrofluoric acids give turbidity. A great advantage of the method is the sensitiveness of the reactions under these conditions. One gram-equivalent of the respective acids can be detected at the following dilutions: By silver, boric and silicic acids in 100 litres; phosphoric, arsenic, and arsenous acids in 1,000 litres; chromic acid in 10,000 litres; oxalic acid in 100,000 litres. With barium and calcium, chromic acid gives a precipitate at 1,000 litres; oxalic and hydrofluoric acids at 100 litres. Confirmatory tests must be used to decide which of the above acids is present.—Zeit. f. anal. Chem., 1895, 533.

An Improved Volumetric Precipitation Process.—P. N. Raikow (Chem. Zeit., 1894, 18, 484, 485).—The cardinal fault of most volumetric precipitation processes is that no direct reading of the end-point is possible, filtration and trial of small portions of the clear filtrates being usually necessary. The author has found that many precipitates which remain obstinately suspended under ordinary conditions, and cause, in the liquid being titrated, an unmanageable turbidity, can be induced to collect and subside by the addition of some immiscible liquid heavier than water, *e. g.*, carbon disulphide or chloroform. Such liquids, although exerting no solvent action on the precipitate, mix intimately with it and carry it down, leaving the supernatant liquid sufficiently clear for the observation of any turbidity produced by the addition of a further quantity of the standard precipitating solution. Carbon disulphide and chloroform are usually, but not invariably, effective. Thus, carbon disulphide carries down silver chloride rapidly and completely, but has no influence on the precipitation of barium sulphate. The application to particular cases of the principle here enunciated is being worked out by the author.

Apparatus for Volumetric Analysis.—D. Sidersky has devised a stand which carries two burettes and two bottles of standard solutions. The latter are Woulff's bottles with two necks, one neck carrying a tube which enters the top of the burette and terminates at the zero. The other is filled with an elastic ball. On squeezing the ball, the pressure of the air drives the solution over into the burette, and on releasing the pressure the excess of

liquid above the zero is returned to the bottle, followed by air until the pressure is equalized.—Zeit. f. anal. Chem., 1894, 438.

Separation of Zinc, Copper, etc.—H. N. Warren suggests a new method for separating zinc from copper and other allied metals, which consists in dissolving the alloy in strong sulphuric acid, adding a few coils of magnesium tape, and maintaining the solution at about 100° F., until the whole of the copper is precipitated. If tin, antimony, or other metals of the same group are suspected, the copper precipitate must be further examined. Any free sulphuric acid in the filtrate should then be neutralized by adding a strong solution of sodium acetate and raising to boiling point, when any iron present will be precipitated as tribasic acetate, while the zinc sulphate will be converted into acetate. Thick sheet or rod magnesium is next added to the solution, and hydrogen is evolved simultaneously with the entire precipitation of the zinc.—Chem. News, lxxi., 92.

Estimation of Water in Hygroscopic Substances.—P. Jannasch and J. Locke.—A U-tube of hard glass has one limb wide, the bend enlarged to a bulb, and the other limb narrower, and bent at right angles a little above the first bend; the laterally projecting end thus formed is ground into the end of a tube which contains dry lead oxide, and is connected at its other end with a calcium chloride tube. The substance is pressed between filter paper, and placed in the U-tube; dry air is then aspirated over it until its weight is constant, as determined by weighing the tube every five minutes, the ends being plugged during weighing. Some dried lead oxide is then shaken down and mixed with the substance, and the mixture heated with a small flame, waved to and fro (so that the glass should not be attacked), whilst the water evolved is aspirated by a current of dry air into the calcium chloride tube, and there absorbed and weighed. The method allows of the estimation of water in such substances as calcium and magnesium chlorides.—Zeit. f. anorg. Chem., 1894, 174.

Reagents.

Sodium Oxalate as Substitute for Oxalic Acid as Standardizing Agent.—Sodium oxalate, because of the absence of crystal water, and the ease by which it is obtained of constant composition, offers a convenient substitute for oxalic acid, as the standardizing agent for volumetric solution of potassium permanganate. It may be prepared as follows:

In the necessary amounts of warm water dissolve 12.5 parts of pure anhydrous sodium carbonate and 10 parts of pure oxalic acid. The solution of the oxalic acid is poured with constant stirring into the warm solution of sodium carbonate. Carbonic acid is given off, and sodium oxalate precipitates as a granular powder in consequence of its comparative insolubility. The supernatant fluid is decanted off, and the precipitate is thrown in a Witt's filter, and by means of a pump washed rapidly with cold distilled water until the wash-water reacts neutral. The precipitate is then dried

at 70° C. This sodium oxalate forms a permanent fine white powder soluble in 31.5 parts of water at 15° C. In the preparation of the $\frac{N}{10}$ volumetric solution, 6.7 Gm. of this correspond to 6.3 Gm. of oxalic acid.

In the preparation of this it should be observed that an excess of sodium carbonate is employed, otherwise an acid oxalate will be formed. The reaction is as follows:

$$\underset{126}{(2COOH).2H_2O} + \underset{142}{Na_2CO_3.2H_2O} = \begin{matrix} COONa \\ | \\ COONa \end{matrix} + CO_2 + 5H_2O.$$

—Pharm. Centralh, 1894, p. 605.

Litmus and Methyl orange as Indicators.—G. Lunge.—Reinitzer has attempted to prove the superiority of litmus over methyl-orange in volumetric analysis. The author admits that in very dilute solutions litmus may prove the more delicate indicator, but, in ordinary practice the results are almost identical.—Zeit. f. angew. Chem., 1894, 733.

Indicators.—B. Reinitzer prefers to all others a properly prepared solution of litmus for the majority of acidimetric and alkalimetric determinations.—Zeitschr. f. angew. Chem., Sept., 1894; Chem. News, 1894, 225.

Luteol, A New Indicator.—Luteol is a chinoxalin derivative with the following formula:

$$C_6H_2\begin{cases} OH \\ N=C(C_6H_5) \\ \quad\quad | \\ N=C(C_6H_5) \\ Cl \end{cases}$$

It crystallizes from alcohol in fine, woolly, yellowish needles which melt at 256°C.; at a higher temperature they are sublimed without decomposition; they are insoluble in water and soluble in alcohol. The new indicator in alcoholic solution yields a distinct yellow coloration with alkaline liquids in cases where litmus and phenolphthalein fail of results. On acidulating, the yellow liquid becomes colorless. On titrating with luteol, there is no transformation of color as in using litmus: the alkaline liquid is rendered completely devoid of color, or *per contra* the colorless acid solution assumes a deep yellow. For analytical purposes a solution is made containing 1 Gm. in 300 Cc. of rectified spirit, and of this solution 3, and at the most 8, drops are used at a time. The luteol solution gives a yellowish color with alkalies, and is even more sensitive to ammonia than Nessler's solution. For example, a single drop of ammonia solution was mixed with a litre of water, and to 5 to 10 Cc. of this mixture a few drops of the luteol solution was added, the result being an evident yellow color, while Nessler's solution only showed a reaction after a short time.—Autenrieth in Arch. der Pharm. 1895, 43.

Speed of Reduction of Ferric Chloride by Stannous Chloride.—L. Kahlen-

berg. The well known reaction between ferric and stannous chlorides proceeds slowly enough at zero to admit of study from the standpoint of chemical dynamics. By a series of carefully conducted experiments, the author has proved that the reaction follows the law of Guldberg and Waage fairly well. In accordance with this law, the speed of the reduction of ferric chloride by an equivalent proportion of stannous chloride is expressed by the equation $\frac{dx}{dt} = C\ (a—x)^2$, in which a represents the amount of substance present at the outset, x the amount of substance changed during the time t, and c, a constant depending on concentration, temperature, etc. Free hydrochloric acid at first favors the reaction, but if more be added, the reaction is sensibly interfered with towards the end.—Jour Amer. Chem. Soc., 1894, 314.

Preservation of Chemically Pure Alkaline Solutions.—A. V. Katecsisgky employs a glass bottle having a removable metallic bottom, and thin beakers of platinum or silver, of such a size that they just fit into the glass bottle. The alkaline solution comes into contact only with the metallic beaker. The flask is closed with a rubber cork and fitted with tubes, as in the case of an ordinary wash bottle; the longer tube is, however, made of platinum or silver.—Zeit. f. anorg. Chem., 1894, 384.

Barium Thiosulphate in Standardizing Iodine.—Plimpton and J. C. Chorley.—The advantages of using this salt are—(1) that it can easily be obtained pure and is of definite composition; (2) it can be kept for a long time. It is best prepared by mixing hot aqueous solutions of barium chloride and sodium thiosulphate, when double decomposition occurs and barium thiosulphate is precipitated as a fine white powder, which is washed and easily purified. The water of crystallization is not easily driven off, so it is necessary to heat it to 120° for some time before weighing as anhydrous salt. It should not be drained by the pump or pressed between filter paper, but on drying in the ordinary manner forms a very light powder which mixes very easily with water, and during the titration it generally disappears, owing to the formation of the soluble tetrathionate. It is unnecessary then to add the starch till near the end of the reaction, and thus greater delicacy is obtained.—Pharm. Jour. Trans., 1895, 808.

Mercuric Oxide in Analysis.—Smith and Heyl find (Zeit. f. anorg. Chem., vii., 82) that on concentrating solutions of certain chlorides to a few drops and then adding mercuric oxide and drying out and then heating to volatilize excess of HgO and the $HgCl_2$ formed, a means for determining some elements was obtained. Zinc and manganese work very well, yielding ZnO and Mn_3O_4. Cadmium requires special care, the $CdCl_2$ being quite volatile, and sometimes escaping before being acted upon by the mercuric oxide. Nickel gives good results if special care is taken. Cobalt gives oxides of varying composition, according to the intensity of

the heat applied, so that this method is unsatisfactory. Bismuth works well if the oxychloride is dissolved in a little HCl, then a slight excess of HgO added and it is then evaporated. If any black spots appear they must be moistened with nitric acid. Final heating to full redness gives pure Bi_2O_3. Mercuric oxide as a precipitant, separated Fe_2O_3 from manganese readily, and fairly well from nickel and cobalt. Not, however, from Bi_2O_3 or Al_2O_3. No satisfactory results were attainable in attempting to separate zinc from manganese by this method.

Action of Potassium Hydrogen Arsenite on the Salts of the Metals.—C. Reichard has investigated the action of acid potassium arsenite, $K_2O,2As_2O_3,H_2O$, on a number of metallic salts in dilute aqueous solutions.—Ber. d. Chem. Ges., 1894, 1019.

Preparation of Potassio-Mercuric Iodide.—E. G. Clayton.—Perhaps the most convenient way of preparing this salt, $2(KI,HgI_2),3H_2O$, is to concentrate ordinary Nessler's reagent, and subsequently to leave the solution to stand for some days. There is an abundant yield of the well-known fine yellow prisms, decomposable by water with the separation of mercuric iodide. The supernatant liquid is poured off, and the crystals may be superficially washed with strong alcohol and dried. The author, who tried this method in 1881, has never seen any reference to it, and thinks that, as merely requiring the use of a reagent already at hand in every laboratory, it is somewhat less troublesome than the similar, though not identical, processes usually described.—Chem. News, 1894, 102.

Action of Sodium Peroxide on Iodine and on Lead Oxide.—M. Hoehnel. When iodine (4 parts) is mixed with sodium peroxide (10 parts) and the mixture is locally heated, an action begins and spreads throughout the mass, a mixture of sodium hydrogen periodate, $Na_2H_3IO_6$, sodium iodide, and iodate being formed. The same products are obtained when sodium iodide is heated with sodium peroxide. When lead oxide is mixed with water, and sodium peroxide added until the mass becomes white, sodium metaplumbate $Na_2PbO_3 + 4H_2O$, is formed. It may be washed with 50 per cent. alcohol, and dried over oil of vitriol; it is white and crystalline; water decomposes it, yielding at first a yellow acid salt, $NaHPbO_3 + 3H_2O$, but ultimately lead peroxide, which is also separated on treating the product with dilute acids. The author has obtained good results by using sodium peroxide for oxidizing iron pyrites, but all crucibles are attacked during the process; a platinum crucible may lose 0.05–0.1 Gm. at each operation.—Arch. der. Pharm., 1894, 222.

Sodium Peroxide in Analysis.—According to the researches of Poleck, sodium peroxide reacts in the same manner as a chemical reagent as hydrogen and barium peroxides, only more energetically.

Sodium peroxide precipitates ferric hydroxide from the ferrous and ferric salts, but manganese peroxide is at once thrown down from the salts

of manganese and cobaltic oxide from those of cobalt; permanganic acid is reduced to manganese peroxide, chromic oxide is oxidized to chromic acid.

With potassium ferricyanide sodium peroxide behaves like the corresponding hydrogen and barium compound, reducing the ferricyanide to ferrocyanide. This behaviour is therefore parallel to Kassner's method for the volumetric determination of this substance. Thus in the sodium peroxide employed in this investigation there were found 83.62 per cent. of the pure compound.

The separation and quantitative determination of iron on the one hand, and of manganese and chrome on the other, is easily and completely effected in the wet way, and gives good results. Iron is precipitated as ferric hydroxide, manganese as peroxide, whilst chrome passes into solution as chromic acid, which is then reduced by means of alcohol, and the chrome weighed as chromic oxide.

The analysis and separation of tin, antimony, and arsenic is very easily effected in the sulphur compounds precipitated by sulphuretted hydrogen, and then dissolved in ammonium sulphide. The latter solution is either evaporated down in order to remove the excess of ammonium sulphide, or the metallic sulphides are once more precipitated. They are then covered with water in a tall beaker, and sodium peroxide is added in small quantities until the color of the sulphides has entirely disappeared, which takes place in the course of a few minutes. The oxidation of the metals and of the sulphur is complete. The oxygen compounds of the metals are separated by known methods.

This method of oxidizing the metallic sulphides has an advantage over that by nitric acid, as in toxicological cases it admits at once of the use of the Marsh apparatus.

The oxidation of carbon compounds in alcholic solution seems to promise good results, as alcohol is not attacked by sodium peroxide, whilst ether is at once ignited.—Ber. d. Chem. Ges., 1894, No. 8.

Sodium-Cobalt Nitrite.—H. Erdmann, as is known, has ascertained that sodium-cobalt nitrite is a very sensitive reagent for compounds of potassium and rubidium. It is prepared as follows (Pharm. Centralh., xxxv,. 753): Dissolve 30 Gm. of crystallized cobalt nitrate in 60 Cc. of water, and add 100 Cc. of concentrated sodium nitrite solution (= 50 Gm. of $NaNO_2$) and 10 Cc. of glacial acetic acid. There will take place, after a while, a change in the color of the solution, as well as a violent evolution of gas. By the aid of this solution of sodium-cobalt nitrite, potassium may be detected even in solution of 1 : 10000. The fluid to be tested must, however, contain no free mineral acids or acetic acid, since the reaction would thereby be prevented.

Permanent Starch Solution.—H. Král adds to the starch solution when

it is cooled some, a little chloroform. This addition does not seem to affect Hübl's iodine method.—Pharm. Centralh., 1894, 606.

Thioacetic Acid, a Substitute for Hydrogen Sulphide.—R. Schiff and N. Tourgie use thioacetic acid in the form of an ammonium salt in quantitative analysis. The reagent, *ammonium thioacetate* [$CH_3.C:O(S.NH_4)$] is prepared as follows: Dissolve thioacetic acid in a slight excess of dilute ammonia, and then dilute to three times the volume of the acid employed. The solution has a faint odor of ammonium sulphide. Not more than about ten days' supply should be prepared, since the solution gradually becomes turbid. *Thioacetic acid* may easily be prepared by the action of glacial acetic acid on phosphorus pentasulphide; but it may be expected to be soon placed on the market by manufacturers. Thioacetic acid is but slightly soluble in water and has a disagreeable odor.

The directions for use are to add to the cold solution of 0.5 to 1.0 Gm. of the metals, the latter in the form of chlorides, from 1.5 to 2.0 Cc. of the test solution, and then to heat to nearly (not quite) the boiling point. When perfectly cooled the precipitate is separated by filtration and the filtrate tested with a few additional drops of the reagent. During the reaction a very faint odor of hydrogen sulphide is noticeable.

In this manner all the metals of Group II. may be completely precipitated as sulphides, not a trace of metals remaining in solution, even when the difficultly separable arsenates were at first present.

Hot hydrochloric acid liberates from ammonium thioacetate intensely active nascent hydrogen sulphide, without, however, causing a precipitation of sulphur. No objectionable chemicals are introduced by this method into the liquid to be analyzed, the resulting ammonium chloride being rather desirable, while the little free acetic acid does no harm.

Metals in Hydrochloric Acid Solution and Ammonium Thioacetate—Arsenites and Arsenates—In cold solution, whitish turbidity; in warm solution, instantaneous and complete precipitation as arsenic trisulphide.

Bismuth, Copper, Stannic and Stannous Salts.— In cold solution, partial precipitation; in warm solution, complete precipitation.

Lead Salts.—In cold solution, a dark-red precipitate (possibly a sulphoprotochloride), which on warming is completely converted into lead sulphide.

Silver Salts.—Silver chloride dissolved in hot concentrated hydrochloric acid is completely precipitated as silver sulphide. The chloride, bromide, and iodide of silver, when heated with the test solution, are converted into silver sulphide.

Cadmium Salts.—Cadmium sulphide being quite soluble in warm hydrochloric acid, the precipitate formed by ammonium thioacetate will disappear on heating; however, it appears again when the solution has completely cooled.

Mercuric Salts.—In cold solution red precipitate of mercuric sulphochloride, which on heating changes to black mercuric sulphide.

Platinum Salts.—In cold solution a red precipitate, which on warming is converted into platinum sulphide.

Gold Salts act precisely as those of platinum.

Ferric Salts are instantaneously reduced to ferrous salts.

Chromic Acid Salts are immediately reduced to chrome salts.

Nickel, Cobalt, Manganese, Zinc, Aluminum, etc., Salts, as was to be expected, are not affected by the test solution. However, the sulphur compounds of nickel, cobalt, manganese, and nickel in ammoniacal solutions, are instantly precipitated by it; but since there are no objections to ammonium sulphide solution, as well as for some other cogent reasons, the latter is retained for precipitating the metals of Group IV.—Ber. d. Chem. Ges.. 1894, 3437.

Tincture of Guaiac as a Reagent.—Ed. Schär (Pharm. Runds., 1894, 254, and Pharm. Centralh., 1894, 565 and 599).

From an experience covering many years, the author looks upon this tincture as an invaluable reagent, though one whose indications are often misunderstood. After reference to Schönbein as the first to use the tincture as a reagent, the author proceeds to a consideration of the blue substance developed when guaiaconic acid, a constituent of guaiac wood, comes in contact with ozonizing substances and which is termed guaiaconic acid ozonide. The blue color is not permanent, easily losing oxygen and becoming colorless. This also occurs in the presence of acids, and alkalies, and likewise from heating. Through further action of the oxidizing substance, however, a blue color is continually developed.

Acetic acid is the only acid that does not interfere with reaction. An excess of the tincture is objectionable. A tincture made from the purest obtainable resin and of 1 to 50 or 1 to 100 strength is best to use. Guaiaconic acid is soluble in alcohol, ether, chloroform, etc., the resin is conspicously so in sodium salicylate and still more freely soluble in chloral hydrate solution, in which latter the acid is especially soluble. A drop of the chloral hydrate solution on a piece of paper shows a clear blue, while a drop of alcoholic tincture shows greenish by comparison. The tincture must be kept in the dark. When used in alcoholic solution the ozonide goes into solution, while if the tincture is added to water, the ozonide is suspended and is scarcely visible until alcohol is added, when a vivid blue color makes its appearance.

It is useful first as a reagent for ozone, and for that whole class of oxygen compounds which give the reaction of ozone (ozonides). To this class belong nitrous acid, hypochlorous acid, metallic superoxides, salts of the noble metals and ferric and cupric salts; substances which do not yield a blue color with tincture of guaiac (which are not ozonides) are, for instance, nitric acid, hydrochloric acid and hydrogen peroxide. The colo-

ration produced by chlorine and bromine is due to the nascent oxygen. In all other cases, however, nascent oxygen fails to produce this blue color. An ozonizing influence is also exerted by plant ferment, or enzymes, Phytolacca decandra secreting such a ferment in large quantities.

The second use of the tincture has in view the transfer of oxygen in the shape of ozone, for instance with hydrogen peroxide or certain oxidized terpenes with extract of malt. Here is where the most errors arise. Hydrogen peroxide alone is wholly without effect on the reagent, only coloring it in the presence of ozone bearers such as ferments, the coloring matter of blood, the oxides of iron and lead and finely divided platinum. Hydrogen peroxide itself is therefore not an ozonide. It is especially noteworthy that blood spots, no matter how old, color guaiac solution a most intense blue in the presence of either hydrogen peroxide or certain essential oils.

The third use of guaiac as a reagent is in the recognition of copper compounds on the one hand and of cyanogen compounds on the other. While copper salts turn guaiac solutions blue, they do not do this in a dilute solution save in the presence of a cyanogen compound, hence this reaction can be used to detect either copper or cyanogen compounds.

Inorganic Acids.

Determination of Boric Acid.—R. Hefelmann has used several of the known methods, and recommends the determination of boric acid by the loss of weight on volatilization of the boron as ammonium borofluoride. Instead of treating the borate with hydrofluoric acid and sulphuric acid, Reischle proposes to mix it in a platinum crucible with six parts of resublimed ammonium fluoride, and to heat slowly, when the chief quantity of the ammonium borofluoride is volatilized, when cold sulphuric acid is added, and its excess is driven off by heat along with the last traces of boron fluoride or of ammonium borofluoride. After a single treatment in this manner a sulphate is obtained completely free from boracic acid. The author obtained very satisfactory results on the analysis of pure borax and of a mixture of weighed quantities of boric acid and lime. The use of this method is always advisable if the base can be weighed as sulphate. If this procedure is not applicable, the author recommends the determination of the proportion of base in another manner, and that of water of crystallization as accurately as possible by a considerable number of experiments and to calculate the boric acid as difference.—Zeit. f. Anal. Chem., 1894.

Influence of Boric Acid on the Solubility of Certain Phenols.—Bernin (Bull. de Pharm. de Lyon) has found that boric acid increases the solubility of thymol, phenol and salicylic acid to a considerable extent. The solubility of thymol in distilled water, which is about 1 in 800, is more than doubled in the presence of boric acid, 3 Gm. dissolving easily in a

liter of boric solution. For phenol its solubility is doubled; but it is particularly on salicylic acid that the solvent power is most marked. While distilled water does not entirely dissolve 1 Gm. per liter, with boric solution 375 Gm. can be dissolved.—Amer. Drug. and Pharm. Rec., 1894.

Method of Estimating Carbonic Acid in the Air.—As is known, free and partly combined carbonic acid has a decolorizing effect on the reaction of phenolphthalein upon alkalies. F. Kretschmer and E. Wiener's new method (Apoth. Ztg., 1894, 833) is based upon this fact. They prepared solutions of sodium carbonate on the one hand, and of sulphuric acid on the other, corresponding per Cc. exactly to 1 Mg. of carbonic acid. In the titration of the sodium-carbonate solution (using phenolphthalein as the indicator) with the sulphuric-acid solution, just half of this acid is consumed, at ordinary temperature, until decoloration takes place, and, on continued boiling, all the acid. The reaction takes place first according to the equation: $2Na_2CO_3 + H_2SO_4 = 2NaHCO_3 + Na_2SO_4$, whereby the semi-combined carbonic acid acts as a decolorant; and afterward, with persistent boiling, it takes place according to the equation: $2NaHCO_3 + H_2SO_4 = 2CO_2 + 2H_2O + Na_2SO_4$, whereby the trace of sulphuric acid in excess leads to decoloration. The same process of reaction occurs in titrating mixtures of sodium hydrate and sodium carbonate. When such a soda-lye is employed to absorb carbonic acid,—the ordinary soda-lye mostly contains carbonate—the difference between the quantities of sulphuric acid used for titration at ordinary temperature before and after carbonic acid absorption, must exactly correspond to half of the absorbed carbonic acid. The application of this method for estimating carbonic acid in the air: An accurately graduated bottle of colorless glass is charged with the air to be examined, and there are added 100 to 200 Cc. of a potassa solution, whose relation to a sulphuric acid of which 1 Cc. exactly corresponds to 1 Mg. of carbonic acid, has been established prior to the experiment. It is advised to put into the bottle also pearls or fragments of glass, to promote the absorption of carbonic acid. The bottle is agitated for about half an hour and then opened to permit of the addition of a few drops of the phenolphthalein solution; titration is then proceeded with as quickly as possible with sulphuric acid until decoloration takes place. If the quantity of sulphuric acid required for complete reaction on the same quantity of the potassa solution amounted, before the carbonic acid absorption, to "a," and after same to "b," then $(a—b) \times 2$ is the number of Mgm. of carbonic acid contained in the bottle of air.

Estimation of Hydrochloric Acid in Gastric Diseases.—Treat 5 to 20 Cc. stomach contents with barium carbonate, thus converting the latter into barium chloride, to which add a slight excess of ammonium monochromate. Treat the resulting barium chromate with hydrogen peroxide and dilute sulphuric acid, and measure the amount of oxygen, one atom of which equals half a molecule of hydrochloric acid. Wagner's azotometer

was used by the author, corrections being made by means of a table for atmospheric pressure and temperature.—Mierzynski, Cent. f. Innere Med., November 17, 1894.

Action of Reducing Agents on Iodic Acid.—C. F. Roberts. Most text-books state that nitric oxide is absorbed by aqueous iodic acid with liberation of iodine, but of the character and degree of ease of the reaction, little is known. The authoress finds that nitric oxide causes no appreciable separation of iodine from dry iodic acid, or from solutions of that acid in sulphuric acid. Nitric oxide is, however, absorbed by aqueous solution of iodic acid of any strength, but the reaction takes place slowly when the gas is confined over the acid, and not at all when the gas is merely passed rapidly through the solution.—Amer. Jour. Sci., 1894, 757.

Iodic Acid and Sodium Iodate, Therapeutically.—After commenting upon the therapeutic action of iodic acid and sodium iodate in various diseases, J. Ruhemann (Therap. Monatsh.; 1894, 158) summarizes his conclusions as follows: Sodium iodate can be applied with success, in pure form, in ulcerations, nasal catarrhs, and laryngitis. In ear diseases, 1 : 5 dilutions with boric acid are indicated; for wounds, 1 : 10; and for the eye, solutions of 1 : 10–20 parts of water. The favorable influence of sodium iodate internally extends to scrofulous affections, glandular swellings, bronchial asthma, etc. The subcutaneous injection (5–20 Ctg.) acts very beneficially upon resolution of glandular swellings, rheumatic pains, acute and chronic neuralgias, neuritis, etc. As much as 15 Gms. in all may be injected in any one case. Internally, one may be administered pro die, in pills containing 15 Cgm. each, one or two to be taken three times a day. The aqueous solutions should be given in milk after meals. Children bear the remedy quite well. Its use, even for weeks, has no injurious effect on appetite and digestion. Its action is very beneficial in chronic bronchial asthma. Iodic acid, which is highly valuable externally as a hæmostatic (in 5 per cent. solution), is very serviceable for surgical purposes as a caustic pencil in ulcerations of the penis and mucous membranes, ulcera cruris, chronic hypertrophic pharyngitis, etc. In the nose, larynx, and uterus, 10 per cent. solutions or ointments may be employed; for instillation into the conjunctiva 5 per cent. solutions; for injections in gonorrhœa, especially with the addition of cocaine, 0.05–0.1 per cent. solutions; and as gargle and wash in angina, diphtheria, mucous-membrane ulcers, etc., a dilute solution is serviceable. The subcutaneous injection of iodic acid pains considerably, even when cocaine is added; after the application, the part should be energetically massaged, to prevent the formation of hard scars. 10–15 Cgms. of the 10 per cent. solution may be safely applied in hypodermatic forms (parenchymatously in struma). No syringe used for injecting morphine should be employed, since even the smallest traces of morphine immediately separate iodine from the iodic-acid solution. The internal use of

iodic acid is indicated in gastric hæmorrhage and violent vomiting.—Merck's Mark. Rep., 1894, 211.

New Method of Performing Schlœsing's Nitric Acid Estimation.—L. L. de Koninck.—The decomposition is effected in a fractionating flask, whose side tube is bent upwards and connected with a small funnel by caoutchouc tubing, which is compressed by a screw clamp The gas evolution tube, which is of small bore, is fitted to the neck of the flask by a rubber stopper. It is bent downwards at an acute angle, and is so long that its lower end is 75–80 Cm. below the bend. At its lower end it is formed into a ⊢ piece, whose vertical tube, 6–7 Cm. long and 7–9 Mm. diameter, carries the graduated cylinder by means of a cork ring with radial notches on its upper surface. It rests on the bottom of a crystallizing pan, containing as much mercury as will just close the end of the long tube, and the whole is plunged into a larger vessel full of water. To make a determination, 40 Cc. of ferrous chloride (200 Gm. of iron to the liter), and 40 Cc. of hydrochloric acid (1.1 sp. gr.) are placed in the flask, and the side tube is filled with acid up to the funnel. The liquid is then boiled until all air is expelled (the graduated cylinder being removed); the nitrate solution is placed in the funnel, and the lamp removed; the mercury rises in the tube, but can never reach the top. The nitrate is rinsed into the flask with hydrochloric acid without admitting air, and the nitric oxide is boiled out, leaving the apparatus ready for the next determination. It is well to adopt Grandeau's suggestion to compare the volume of gas obtained in an analysis with that yielded by a known amount of nitrate under the conditions as to time. The ferrous chloride in the flask suffices for as many estimations as will afford 800–900 Cc. of nitric oxide, or even for more if it is reduced again by adding stannous chloride. It is, however, absolutely necessary to avoid an excess of stannous chloride, and especially to leave none in the funnel and side tube.—Zeit. f. anal. Chem., 1894, 200.

Origin of Nitric Acid.—Experiments and arguments by T. L. Phipson that ammonia preceded the formation of nitric acid.—Chem. News, 1894, 283.

Estimation of Nitric Acid.—Barille, remarking on an article by Henry, states that as long ago as 1878 he had proposed the use of the nitrometer for the estimation of nitrate in potable waters.—Jour. Pharm. Chim., 1894, 441.

Estimation of Very Small Quantities of the Nitrogen Acids—G. Lunge and A. Luvoff.—This may be accurately effected by a colorimetric test. 0.2 of brucine is dissolved in 100 Cc. of pure sulphuric acid. 0.0721 Gm. of potassium nitrate is dissolved in 100 Cc. of water, and 10 Cc. of this is diluted to 100 Cc. with strong sulphuric acid. 1 Cc. of the nitrate solution to be tested is mixed with 1 Cc. of the brucine solution, and diluted with sulphuric acid to 30 Cc.; a red color makes its appearance, but can-

not be taken advantage of. The contents are temporarily put into a beaker and heated to 70–80°, which will change the color to a permanent greenish-yellow. Trial experiments are now made with the standard nitrate solution, until the same tint is obtained, when the operation is finished. Contrary to general belief, the reaction is not interfered with by the presence of a nitrite.

Estimation of Nitrous Acid in Commercial Sulphuric Acid.—1 Cc. of Griess's reagent is put into each of a pair of Nesslerizing tubes and mixed with 40 Cc. of water and 5 Gm. of sodium acetate. To the contents of the first tube 1 Cc. of the suspected acid is added, and to the other, without delay, 1 Cc. of a standard nitrite solution, prepared by dissolving 0.0493 Gm. of pure sodium nitrite in 100 C.c. of water, and diluting 10 Cc. of this to 100 Cc. with pure sulphuric acid. The reddish colors may be compared after any convenient time, but it is best to wait five minutes. Griess's reagent is prepared as follows: 0.1 Gm. of white a-naphthylamine is boiled for 15 minutes with 100 Cc. of water and mixed with 5 Cc. of glacial acetic acid. The solution is mixed with 1 Gm. of sulphanilic acid dissolved in 100 Cc. of water, and the mixture preserved in a well corked bottle. If, in course of time, it should become rather too red, it may be decolorized by shaking it with zinc dust.—Zeit. f. angew. Chem., 1894, 345.

Volumetric Estimation of Nitric Acid.—D. Monnier and H. Auriol.—The process is based on the well-known principle that nitrates are reduced by nascent hydrogen. Sodium amalgam, prepared by adding 1 part of sodium to 100 parts of hot mercury, is allowed to act on the solution of the nitrate in the presence of tartaric acid. The hydrogen is collected and measured, and a check experiment is made with the same amount of amalgam without the nitrate. The difference of hydrogen evolved is the measure for calculating the amount of nitric acid.—Chem. Centr., 1894, 1095; from Arch. Sci. Phys., Geneve, 31, 352.

Phosphoric Acid Determination.—Hugo Neubauer has found that the precipitate of ammonium-magnesium phosphate only possesses the correct composition ($MgNH_4PO_4$) when an excess of magnesia has been employed with not more ammonia present than is absolutely necessary for separation. For the exact determination of phosphoric acid the following directions are given: The acid is precipitated by means of molybdate solution, the well-washed precipitate being dissolved in 100 Cc. of 2.5 per cent. of ammonia water, then add, dropping in slowly as many cubic centimeters of magnesia mixture as there are centigrammes of P_2O_5. After standing three hours the precipitate is collected and washed with 2.5 per cent. ammonia water, then ignited, bringing it slowly to the temperature of the blast-lamp flame, then weighing.

Estimation of Phosphoric Acid by the Citric Acid Process.—F. Glaser

has proven that when the citrate process is used a very large excess of magnesia mixture is essential for success. In presence of much calcium and iron, this precaution is, perhaps, superfluous, but in most cases when excess of magnesium fails, the precipitate is not the well-known triple phosphate, but consists more or less of a compound having the formula $Mg(NH_4)_4(PO_4)_2$, which on ignition is converted into pyrophosphate, whilst the liberated phosphoric anhydride is volatilized.—Zeit. f. angew. Chem., 1894, 543.

Direct Estimation of Citrate Soluble Phosphoric Acid.—B. B. Ross now recommends destroying citric acid by imitating Kjehldahl's method, and operates as follows: After digesting the phosphate with 100 Cc. of the official citrate solution, 25 Cc. of the liquid is at once filtered into a dry vessel, preferably a burette, and, after cooling, an aliquot part is put into a digestion flask of 250–300 Cc. capacity, 15 Cc. of strong sulphuric acid is added, and the flask put on a piece of gauze over a moderately brisk flame. After about 8 minutes, foaming and darkening will set in; after a further lapse of 3–4 minutes the foaming will cease. About 1 Gm. of mercury is now added, and the digestion continued over a high flame; after about half an hour, a clear and almost colorless liquid will be obtained. The solution is washed into a beaker, rendered slightly alkaline with ammonia, then acidified with nitric acid, and treated by the regular molybdate method. The test analyses are entirely satisfactory.—Jour. Amer. Chem. Soc., 1894, 304.

Estimation of Phosphoric Acid by Titrating the Yellow Precipitate.—B. W. Kilgore.—2 Gms. of the phosphate is dissolved in 30 Cc. of nitric acid and 5–10 Cc. of hydrochloric acid, and diluted to 200 Cc.; 20 or 40 Cc. is now put into a beaker, mixed with ammonia until a precipitate just begins to form, and diluted to 75 Cc. If much of the nitric acid was lost when making the solution, 10–15 Gms. of ammonium nitrate had better be added. After heating on the water-bath to 60°, excess of ammonium molybdate solution is added, and after standing for five minutes the liquid is filtered and the precipitate washed by decantation until the washings are no longer acid. The filtration is best carried out by using a Hirsch funnel in connection with a filter pump. The precipitate is then dissolved in excess of standard potash and titrated with standard nitric acid. The molybdate solution is made by dissolving 100 Gms. of molybdic acid in 417 Cc. of ammonia (sp. gr. 0.96), and pouring this into 1250 Cc. of nitric acid (sp. gr. 1.20). The solution should be filtered before use.—Jour. Amer. Chem. Soc., 1895, 765.

Determination of Pyrophosphoric Acid.—J. B. Nagelvoort calls attention to the following details (recommended by J. Stieglitz): Dissolve 1 Gm. of the salt under examination, for the determination of pyrophosphoric acid in ten (10) Cc. of water. There is no necessity for boiling. When

the salt is dissolved add 10 Cc. of a 10 per cent. solution of KOH or NaOH; stir and filter after a little while into a 25 Cc. graduate. Between 12 and 15 Cc. of a colorless filtrate are obtained. Add 5 Cc. of a 10 per cent. NH_4Cl solution and add drop by drop from 1 to 2 Cc. of a 10 per cent. $MgSO_4$ solution. Shake the graduate slowly, so long as the precipitate redissolves. Do not stir vigorously. In this way the orthophosphates of the alkalies are separated from the pyrophosphates. Orthophosphates of NH_4 and Mg form later if present. When the filtrate remains clear, no orthophosphate is present.

If a ppt. has formed of orthophosphates, it is dissolved in dilute acetic acid and tested with a 5 per cent. $AgNO_3$ solution. Nagelvoort finds $AgNO_3$ detects as much as 0.001 Gm. The reaction with molybdate solution is sensitive to orthophosphates to the 5th decimal place.—Amer. Jour. Pharm., 1895, 210.

Estimation of Phosphoric Acid.—S. W. Johnson states that although the citrate method generally gives good results, this is only caused by a fortunate compensation of errors, the magnesia precipitate being contaminated with lime, and also with iron and alumina, whilst the filtrate retains notable quantities of phosphoric acid. As regards the molybdate precipitation, the process generally gives results which are too high, and if an effort be made to prevent this by adding more nitric acid, the results will be too low, unless the filtrate is further digested with more molybdate solution.—Jour. Amer. Chem. Soc., 1894, 462.

Estimation of Soluble Phosphate.—V. Edwards finds that allowing the precipitate of ammonium magnesium phosphate to settle during either 1½ to 48 hours does not give rise to any variation of importance in the numbers obtained for soluble phosphate in superphosphate; he regards 2½ hours as sufficient to allow for the settlement.—Chem. News, 1895, 69.

Phosphoric Acid—Volumetric Estimation of—A. F. Holleman.—From phosphates of the form M'_2HPO_4, to which state acid solutions of phosphates may be brought by adding phenolphthalein, and then an alkali until the change of color just occurs, the phosphoric acid is completely precipitated by silver nitrate in presence of excess of sodium acetate. A known quantity of silver is added, and the excess is titrated by Volhard's method. A large excess is to be avoided, as the results are then less exact. —Zeit. f. anal. Chem., 1894, 185.

Volumetric Estimation of Phosphoric Acid—R. Segalle.—Direct acidimetric titration of phosphoric acid, with whatever indicator, does not furnish exact results. The following small modification of Glücksmann's method is both rapid, convenient and accurate. To the solution of the phosphoric acid a liberal known excess of a standard ammonia solution is added; then sufficient of a perfectly neutral solution of magnesium sulphate. The mixture is made up to a known volume, vigorously shaken,

and immediately filtered through a dry filter. The excess of ammonia is titrated, and 1 mol. of phosphoric acid is calculated for 3 mols. of ammonia, which have undergone one neutralization.—Zeit. f. anal. Chem., 1895, 33.

Phosphates of Calcium and Iron.—E. A. Schneider.—The "hydrogel" obtained by dialyzing a solution of ferric chloride saturated with normal calcium orthophosphate contains ferric oxide and phosphoric anhydride in the proportion 55.29 : 44.7$_1$. When the solution of this hydrogel in ammonia is dialyzed, ammonium phosphate is removed; after 13 days the ratio was 82.37 Fe_2O_3 : 17.63 P_2O_5. After another 15 days, the phosphoric anhydride amounted to 11.07 per cent., and after another 19 days, the phosphoric anhydride amounted to 9.17 per cent. The slowness of the removal of phosphoric anhydride after the first 13 days is probably due to the reformation of ferric phosphate from the double compound of ferric phosphate and ammonium phosphate which is probably present in the solution. When the hydrogel is treated with potassium hydroxide, it is almost quantitatively converted into potassium phosphate and ferric hydroxide. When treated with potassium carbonate, a double compound is formed, soluble in water, which, when allowed to remain in solution, deposits a precipitate. When this precipitate is subjected to dialysis, it contains phosphoric anhydride and ferric oxide in the proportion 15.10 : 84.90. A solution of ferric sulphate, prepared by digesting normal calcium orthophosphate with a solution of ferric sulphate, and containing 130.8 Gms. P_2O_5, 183.54 Gms. Fe_2O_3, and 238.62 Gms. SO_3 per 1000 C.c., was diluted three successive times with water; the precipitates so produced contained phosphoric anhydride and ferric oxide in the proportion 1 : 1.36. 5 C.c. of the above solution, after dilution with 900 C.c. of water, contained 3.22 per cent. of the P_2O_5 originally present, 8.72 per cent. of the Fe_2O_3, and 92.62 per cent. of the SO_3. The author points out the application of the above results to the manufacture of soluble phosphates from natural phosphates and Thomas slag.—Zeit. f. anorg. Chem., 1894, 386.

Arsenic in Phosphates, etc.—M. Schlagdenhauffen finds that phosphates and alkaline hypophosphites frequently contain arsenic, although in very small proportion, and he urges therefore that only such preparations should be employed in medicine as yield negative results when tested in Marsh's apparatus.—Bull. com., 1894, 466, through Pharm. Jour. Trans.

The Hypophosphites of Mercury and Bismuth.—S. Hada stated that when solutions of mercuric nitrate and sodium hypophosphite are mixed, mercurous hypophosphite is formed and separated as a double salt, which is perfectly stable and crystalline, and has the formula $HgH_2PO_2.HgNO_3.H_2O$. On heating at 100° it explodes, and with hydrogen chloride yields calomel and then mercury. Bismuth hypophosphite is precipitated on

mixing solutions of bismuth nitrate (free from acid) and calcium hypophosphite. The precipitate is a white crystalline powder which must be at once separated by filtration from the mother liquor, otherwise decomposition takes place. The salt is decomposed by water yielding phosphine, PH_3 and other products, and on heating the salt decomposes according to the following equation: $3Bi(H_2PO_2)_3 = 2Bi + Bi(PO_3)_3 + 6P + 9H_2O$, and yields metallic bismuth, phosphorus, bismuth phosphite and water.—Jour. Chem. Soc., 1895, 227.

Thiohypophosphates.—C. Friedel has been able to prepare compounds of sulphur and phosphorus, belonging to a new series, the type of which corresponds to the salts of hypophosphoric acid. Iron thiohypophosphate, $Fe_2P_2S_6$, occurs in grayish-black hexagonal plates resembling graphite; the copper salt, $Cu_2P_2S_6$, forms small needles; aluminum and zinc yield white and pale yellow compounds respectively; whilst the thiohypophosphates of lead, silver, mercury and tin, have also been obtained and are duly described in the paper.—Compt. rend., cxxi., 260.

Potassium, Double Salts of Hypophosphoric Acid.—C. Bausa.—The sodium hydrogen salt of the acid $Na_2H_2P_2O_6$, was first prepared by immersing sticks of phosphorus, all but about 1 Cm. of each, in a 25 per cent. solution of sodium acetate; it separated in crystalline crusts. It was converted by means of barium chloride into the barium hydrogen salt, and this by means of potassium sulphate into the potassium hydrogen salt. By adding to a strong solution of the latter solutions of salts of the heavy metals, amorphous precipitates were first obtained, consisting of the normal hypophosphates of the heavy metals, but these gradually took on a crystalline form, becoming converted into the acid potassium double salts. The latter were dried on a porous plate and analyzed at once; they were not washed, as water decomposes them. By neutralizing a solution of potassium hydrogen hypophosphate with caustic potash, a solution of normal potassium hypophosphate was obtained; on adding solutions of heavy metals to this, amorphous precipitates of the normal hypophosphates were at first formed, but gradually became converted into the normal potassium double salts. The acid double salts, when heated in the air, seem to form first pyrophosphates and then metaphosphates, but hydrogen is evolved, and some hydrogen phosphide.

Acid Double Salts.—Those of nickel (green), cobalt (pink), zinc and copper (blue), with potassium, form crystals of the rhombic system, and are isomorphous.

Normal Double Salts.—The nickel, $NiK_2P_2O_6 + 6H_2O$, and cobalt, $CoK_2P_2O_6 + 5H_2O$, potassium double salts were prepared; they are respectively green and pink. The potassium sodium double salts, $K_2Na_2P_2O_6 + 9H_2O$, can be obtained by neutralizing the potassium hydrogen salt with sodium carbonate; the same substance is obtained when the

sodium hydrogen salt is neutralized with potassium carbonate. It forms colorless crystals belonging to the rhombic system. a : b : c = 1.0728 : 1 : 1.0845.—Zeit. f. anrog. Chem., 1894, 128.

Sulphuric Acid Concentrated by Electricity.—Bertram Blount proposes to heat the acid to be concentrated by means of a platinum conductor entering the liquid and traversed by an electric current sufficient to raise its temperature to 150° above that of the acid. The latter may therefore be placed in non-metallic vessels, which are no longer subject to breakage, since they do not transmit heat. In order to be concentrated from 60° to 66° B., 117 Kgms. of acid require 32,679 heat units, say 44.2 horse power. It results from these figures that electric concentration requires an output of fuel five times greater than direct condensation; but by reason of other advantages it is possible that the final cost of the operation may, notwithstanding, be less than by direct heating, especially in the case of a motive power produced by waterfalls.

Blount recommends the use of a platinum wire 5 Mm. in diameter and 77 Cm. in length heated to 480° C. by a 364 ampere current. Such a wire would be able to concentrate 24 Kgms. of acid in five hours. The maximum difference of potential would be 5 volts. It seems insufficient to cause a sensible loss of platinum through electrolysis, and any such loss might be completely eliminated by the use of alternating currents.—Amer. Drug. and Pharm. Rec., 1894.

Congelation of Sulphuric Acid.—Raoul Pictet recently described some new experimental researches on the congelation of sulphuric acid of different degrees of concentration. Four extensive series of experiments carried out on large volumes of the acid, in different ways, and with all the precautions indicated by the study of the laws of crystallization at low temperatures, yield concurrent curves which include the cases between pure H_2O and pure H_2SO_4. This curve crosses the line of zero temperature five times, including origin with pure H_2O. On descending parts of the curve the liquid contains a larger proportion of acid than the solid, on ascending parts the inverse is the case; at the summits of the curve the titre of the liquid is the same as that of the solid. The maxima and minima do not, in general, correspond to definite hydrates.—Nature; Brit. and Col. Drug., 1894, 517.

Standardization of Sulphuric Acid.—Weinig has described a method for the standardization of sulphuric acid by means of weighing the ammonium sulphate obtained by mixing an accurarely measured quantity of the sulphuric acid solution with an excess of ammonia, evaporating, drying, and weighing. His method of procedure is as follows: To an accurately measured quantity of the sulphuric acid solution, ammonia in slight excess is added, the solution evaporated to dryness, dried for half an hour at 115° to 120° C., cooled in a desiccator, and weighed as ammonium sulphate. The experiments of S. F. Shiver indicate some slight decomposition when

an aqueous solution of ammonium sulphate is evaporated to dryness. In order to get the neutral salt he moistens the evaporated contents with ammonia water (0.960) then evaporates on a water-bath until the contents are quite dry, then removed and dried for half an hour at 110° to 120° C., cooled in a desiccator, and weighed; the drying repeated for another half hour at the same temperature, cooled and weighed. No further loss of weight occurred from this second drying in these experiments.

The results of this method compared with the precipitation by barium chloride and weighing as barium sulphate are quite close and satisfactory. In 1 C.c. of $\frac{N}{2}$ sulphuric acid there was found by the barium chloride method 0.02007 gram of sulphur trioxide, equivalent to 0.00855 Gm. of ammonia. The ammonium sulphate method gives 0.01998 Gm. of sulphur trioxide, equivalent to 0.00851 Gm. of ammonia. Therefore 1 C.c. of the sodium hydroxide solution (50.35 C.c. of which equals 20 C.c. of the $\frac{N}{2}$ sulphuric acid) is equivalent to 0.003396 Gm. of ammonia by the barium chloride method; and by the ammonium sulphate method 0.003380 Gm. of ammonia.—Drug. Circ., 1895, 129; from Jour. Amer. Chem. Soc.

Volumetric Estimation of Sulphuric Acid.—W. Windish, in estimating the amount of combined sulphuric acid in waters takes 100 C.c. or more of the sample acidified with hydrochloric acid, boiled, neutralized with ammonia, and boiled with 50 C.c. of $\frac{N}{15}$ solution of barium chloride. 50 C.c. $\frac{N}{15}$ solution of potassium chromate is then at once added, and after boiling for another minute or two the whole is rinsed into a 300 C.c. flask. After cooling, water is added up to the mark, the mixture well shaken and filtered; 100 C.c. of the filtrate is then mixed with 50 C.c. of $\frac{N}{50}$ solution of arsenous acid and 5 C.c. of 20 per cent. sulphuric acid, and after the liquid has become colorless 100 C.c. of a saturated solution of sodium hydrogen carbonate is added, then a little starch solution, and the excess of arsenous acid is titrated with $\frac{N}{50}$ solution of iodine. If T_1 be the titre between the iodine and the arsenous acid, T_2 the titre between arsenous acid and potassium chromate, and J the number of C.c. of iodine solution used, then, $x \frac{12(T_1 - J)}{T_1 - T_2}$ = Gms. of SO_3 in 100 C.c. of water. In estimating the sulphuric acid in insoluble sulphates, these are converted into sodium sulphate by fusing with sodium carbonate. The solution is then treated as before.—Chem. Centr., 1895, 198.

Hyposulphurous Acid.—E. Schär.—Attention is drawn to the fact, hitherto overlooked, that Schönbein had prepared hyposulphurous (hydrosulphurous) acid, and investigated many of its properties, several years before Schützenberger occupied himself with the subject. Schönbein found that when an indigo solution has been bleached with hyposulphurous acid, the color can be restored not only by oxidizing, but also by reducing agents, and even by heating in the absence of air. He thought,

in consequence, that the original loss of color must be due to the formation of an unstable compound of the coloring matter with the hyposulphurous acid. The author has repeated and extended Schönbein's experiments, and confirmed his results; he also is of opinion that the decolorization of indigo by hyposulphurous acid cannot be explained satisfactorily as a reduction of the coloring matter.—Ber. d. Chem. Ges., 1894, 2714.

Elements.

ALUMINUM.

Aluminum—Detection of.—G. Neumann.—The presence of a minute quantity of aluminum in ordinary samples of potassium hydroxide and sodium hydroxide renders any method of detecting the metal, in which one of these reagents is employed, extremely unsatisfactory. The following is suggested as giving trustworthy results. The iron, chromium and aluminum, precipitated as oxides by barium carbonate, are boiled with barium hydroxide solution, and the filtrate made slightly acid with hydrochloric acid and precipitated hot with sulphuric acid. The filtrate is concentrated and treated with ammonia, when the formation of a white zone shows the presence of aluminum.—Monatsh. f. Chem., 1894, 53.

Crystallized Aluminum Carbide.—H. Moissan has prepared by the aid of his electric furnace, a crystallized compound of carbon and aluminum, represented by the formula C_3Al_4. The compound occurs in the form of fine, transparent, yellow crystals, attaining a diameter of 5 Mm. to 6 Mm. in some instances. Their density is 2.36, and the compound requires the highest temperature of the electric arc for decomposition. It possesses very marked reducing properties, and slowly decomposes water at the ordinary temperature, methane, CH_4, being evolved.—Compt. rend., cxix. 16.; P. J. Tr.

New Aluminum Alloy.—Equal proportions of tungstic acid and cryolite are melted together, and when the temperature has reached 1200° C. aluminum is added, so as to produce a 10 per cent. compound of aluminum and tungsten. A second alloy is made containing equal proportions of aluminum and copper; these two alloys are then melted, together with pure aluminum and the addition of tin and antimony (frequently manganese or nickel) so that the finished alloy has the percentage composition as follows: Aluminum, 98.04; tungsten, 0.038; antimony, 1.442; tin, 0.105; copper, 0.375.—Pharm. Era, 1895, 43.

To Silver Aluminum.—Le Photographe gives the following: In 1000 parts of distilled water dissolve 25 parts of zinc chloride and the same amount of zinc iodide, and add 50 parts of glycerin. Immerse the aluminum article in this bath for a short time, remove, wash, and then plate by any of the usual methods.—Nat. Drug., 1895, 147.

Production of Metallic Films specially adapted for covering Aluminum.—

C. Göttig.—Aluminum becomes covered with a hard film of copper on rubbing it with tin dipped in copper sulphate solution ; the deposit increases in thickness if the coated metal is suspended in a dilute copper salt solution. Aluminum is covered with tin by rubbing it with brass moistened with solutions as certain tin salts, such as ammonium stannichloride, $SnCl_4$, $2NH_4Cl$; in this case, too, the deposit increases in thickness when the metal is suspended in a tin salt solution of suitable concentration. Aluminum which has been coated with copper as above described, when suspended in a solution of tin salt, receives a coating of tin over the copper.—Ber. d. Chem. Ges., 1894, 1824.

AMMONIUM.

Colorimetric Estimation of Ammonia.—L. Ilosvay de Nagy Ilosva recommends the employment of Wolff's colorimeter for the estimation of small quantities of ammonia. Trommsdorff's is the best for the colorimetric determination of nitrous acid ; the estimation of nitric and nitrous acids by reduction to ammonia by distillation with metallic iron, is only accurate if the iron is pure. Full directions for carrying out the various operations are given—Bull. Soc. Chim., 1894, 216.

Preparation of Ammonium Nitrite.—S. P. L. Sörensen employs a modification of Erdmann's method. The mixture of nitrogen oxide evolved during the action of arsenous anhydride on nitric acid is passed over coarsely powdered ammonium carbonate kept cool by ice. The half liquid mass is treated with alcohol, the unchanged carbonate filtered off, and the ammonium nitrate precipitated by the addition of ether. The nitrite so obtained is of 90–94 per cent. purity, and may be purified by resolution in 96 per cent. alcohol and reprecipitation with ether. Pure ammonium nitrite forms almost colorless needles, which are deliquescent, and dissolves in water with development of heat. It is easily but slowly soluble in alcohol, and is precipitated from the solution by ether, chloroform, and ethylic acetate. Concentrated solutions appear to decompose with explosive force at 60–70°, like the solid salt, and in acid solutions such decomposition sometimes occurs at ordinary temperatures. The dry salt may be safely kept in an atmosphere of hydrogen, and in presence of pieces of ammonium carbonate and of lime. It is best kept and transported under absolutely dry and alcohol-free ether.—Zeit. f. Anorg. Chem., 1894, 33.

Ammonium Persulphate as a Substitute for Potassium Permanganate.—Ammonium persulphate $(NH_4)_2S_2O_8$ is obtained in small, colorless crystals, which do not dissolve perfectly clear in water, while the solution, when heated, yields active oxygen. Leonard Wacker reports that a 0.5 to 2 per cent. solution of ammonium persulphate is an energetic bactericide, especially in the cases of the comma bacillus, erysipelas streptococcus, staphylococcus aureus, and bacillus pyocyaneus. Being practically harmless it forms an excellent substitute for potassium permanganate, in mouth

washes for instance, and may prove useful as a preservative and deodorizer of food products.—West. Drug., 1895, 190.

ANTIMONY.

Antimonial Vermilion is not an Oxysulphide.—In cold or in heat, with tartar emetic and tartaric acid, the coloring matter of antimonial vermilion formed by sodium thiosulphate, in as far as it is a chemical species, is the ordinary sulphide, Sb_2S_3. There is no formation of oxysulphide in this reaction as Wagner has pretended.—Compt. Rend., vol. cxix., No. 17.

Antimony Sulphide.—H. Baubigny discusses the question whether the compound formed by the action of an alkaline hyposulphite upon antimony trichloride is a sulphide or, as generally supposed, an oxysulphide, and gives the results of experiments performed with a view to solving the problem. He concludes that the coloring matter of the so-called vermilion of antimony, formed by the action of sodium hyposulphite on tartar emetic in the presence of tartaric acid, in so far as it is a definite chemical compound, is the ordinary sulphide, Sb_2S_3. If it possesses a special tint that, it is asserted, is due to the conditions under which the compound has been prepared. As to the compound prepared from antimony trichloride in the absence of tartaric acid, if it contains oxygen it is only as an admixture in the form of oxychloride (Compt. Rend., cxix., 687).—Pharm. Jour. Trans., 1894, 353.

ARSENIC.

Bettendorf's Test.—C. O. Curtman (Report No. 1 of Research Com. B., of the Com. of Revis. of U. S. P., 1890) has made a number of experiments for the purpose of ascertaining the conditions most favorable to the result of the test for arsenic by stannous chloride (Bettendorf's test and its modifications).

The inquiry was directed to the following points:

1. The limit of sensitiveness of the test in its various modifications.
2. The best proportion of reagent to specimen.
3. The influence of the use of metallic tin together with the stannous chloride.
4. The influence of the presence of other substances in the specimen tested.

The following reagents were used:

a. The solution directed for Bettendorf's test by the U. S. P., consisting of a saturated solution of pure stannous chloride in pure concentrated hydrochloric acid. The specific gravity of this solution was = 1.467.

b. Metallic tin, perfectly pure, in thin cylinders, from which shavings of about 0.1 Gm. were taken as needed.

c. Stannous chloride solution prepared according to the German "Arzneibuch," by saturating a mixture of 5 parts of crystals of stannous

chloride and 1 part of hydrochloric acid with dry hydrochloric acid gas. The specific gravity was = 1.912.

Curtman concludes:

(1) That *for practical purposes* the utmost limit of reaction is reached at 0.03 Mgm. of As in 1 C.c., and that the method employing metallic tin and heat is to preferred, where the presence of antimony or bismuth does not forbid its use. Even the addition of pure concentrated sulphuric acid, which was recommended when the test was first introduced, has not yielded any substantial advantage in detecting the presence of arsenic in the greater dilutions.

(2) In the experiments it was observed that both with the U. S. P. solution (without the use of metalic tin) and with that of the German Pharmacopæia, the greatest intensity of color obtained after an hour's reaction occurred when 1 C.c. of the arsenical solution was mixed with 2.5 C.c. of the reagent. Between 3 C.c. and 2 C.c. of the German solution hardly any difference could be found. But with the pale U. S. P. solution a very slight difference appeared in favor of 2 C.c. as against 3 C.c. Heat did not appear to affect the proportion needed.

When metallic tin was added it seemed to be best to use equal volumes of specimen and reagent, although the variable amount of dark coatings of reduced arsenic adhering to the tin prevented an accurate comparison.

3. When metallic tin is heated with pure concentrated hydrochloric acid, a copious evolution of hydrogen results. When heated with the saturated solution of stannous chloride in hydrochloric acid, the evolution of hydrogen is but scant. When arsenic is mixed with the solution, the evolution of gas is perceptible, but very feeble. Very little arsine appears to be evolved, for a paper cap with a drop of acidulated silver nitrate does not show any evidence of reduction by AsH_3 for over 15 minutes, and even at the end of an hour but a very faint arsenic reaction is seen. After arsine is once formed, it is not decomposed by stannous chloride. While the action of metallic tin is to accelerate and intensify the reduction of tin, it cannot be employed to detect arsenic in preparations of bismuth or antimony. The flocculi of Sb or Bi are firm, while the As separates in finely divided brown particles.

4. In further tests no difference in the intensity of the test could be made out, nor were the differences in the time of the occurrence of the coloration sufficiently great or regular to justify the assumption that the reaction was impeded or accelerated by the presence of other salts.

Reduction of Arsenic.—F. A. Gooch and I. K. Phelps employ a Mohr's distillation apparatus and the action of hydrochloric acid and potassium bromide.—Chem. News., 1894, 307; Amer. Jour. Sci., Sept., 1894.

Salts of Arsenous Acid.—Up to the present time only a few of the salts of ortho-arsenous acid $As(OH)_3$, have been obtained, and the existence of some of these has been doubted. The whole question has, however,

been reinvestigated by Stavenhagen, who has prepared several new salts and confirmed some of the previous observations. Only the ortho-arsenites of calcium, magnesium, zinc and silver were known, and possibly the lead, chromium and nickel salts. The salts of the alkali metals have been prepared in a similar manner to that of the potassium salt, which is as follows: "Alcoholic potash and arsenous acid are mixed and boiled for a long time. After evaporation, the syrupy mass is crystallized from absolute alcohol, when potassium ortho-arsenite, K_3AsO_3, is obtained in needle shaped crystals." The sodium and ammonium salts are non-crystalline, and are obtained in a similar manner. By means of the potassium salt, the corresponding salts of the other metals as strontium, barium, cadmium, tin, gold, platinum, etc., were able to be isolated and examined. The general method of preparation was as follows: The salt of the metal, generally the chloride, was mixed with an aqueous or alcoholic solution of potassium ortho-arsenite, when the arsenite of the metal is precipitated and separated by filtration and purified if necessary by suitable methods. The complete series of metallic ortho-arsenites were obtained with the exception of those of chromium, nickel and possibly copper. The salts of meta-arsenous acid, $HAsO_2$, and of pyro-arsenous acid, $H_4As_2O_5$, were also examined and prepared, but this work was chiefly a confirmation of that of previous workers.—Jour. f. prakt. Chem., li., 1.

The Yellow Modification of Arsenic.—J. W. Retgers. In his previous paper the author had neglected to notice Schuller's work, to which he now draws attention. Schuller sublimed pure arsenic in a vacuum, and obtained a yellow sublimate of arsenic, characterized by its extreme volatility and by its instability. He further calls attention to the parallel series of modifications of phosphorus and arsenic.

Phosphorus.	*Arsenic.*
(*a*) Colorless, regular.	(*a*) Yellow.
(*b*) Light red (? regular).	(*b*) Black (? regular).
(*c*) Dark red to opaque, hexagonal, "metallic phosphorus."	(*c*) Silver-white, hexagonal.

—Zeit. f. anorg. Chem., 1894, 317.

Recognition of Arsenic in Textile Goods, etc., in Sweden.—According to the Swedish law the sale of the following articles is forbidden: Paper hangings, curtains, carpets, Venetian blinds, artificial flowers, and other wares printed or painted from water-colors (glue, gum, starch, dextrine, albumen, etc.) with arsenical pigments, if from 200 square centimeters of the object a brown or black-brown arsenical spot can be obtained which is at least partially opaque. The arsenical spot is to be produced by the reduction of arsenic sulphide with potassium cyanide and sodium carbonate, and the reduction tube must have an internal diameter of 1½ to 2 Mm. The same law holds good for tissues, yarns, lamp-screens, sealing-wax, wafers, stearine or other candles; if in case of tissues and lamp-screens

100 square centimeters, and in case of other articles 21 Gms. yield an arsenical mirror.—Chem. News, 1895, 136.

Modification of Marsh's Test.—A modification of Marsh's apparatus, which permits of the weighing of the arsenic deposited in the tube, is described by Ernst Berillot in the Bulletin de la Société Chemique. The generating flask is connected with a tube of green glass, heated in three sections by burners. The substance to be analyzed, after the animal matter has been destroyed by one of the ordinary processes, is treated with fuming nitric acid and potassium nitrate, the nitrous acid being afterward removed by heating with excess of sulphuric acid. The solution is concentrated down to about 200 C.c., and after being proved to be free from nitric and nitrous acids, is introduced gradually into the generating flask, where the gas is liberated in the usual manner. The sections in which the rings of arsenic are deposited are detached and weighed, washed with fuming HNO_3, dried, and again weighed, the difference giving the amount of arsenic. Lambert recommends the substitution of sodium amalgam for zinc in making Marsh's test.—Amer. Drug. and Pharm. Rec., 1894.

BISMUTH.

Tellurium in Bismuth Preparations.—Jansen observed that a brown color developed in adding chloride of tin solution to a specimen of bismuth sub-carbonate which he had reason to believe was free from arsenic. The absence of arsenic was shown by testing with zinc in acid solution and with silver nitrate paper. Further investigation proved the presence of a small proportion of tellurium.—Brit. and Col. Drug., 1894, 289.

The Bismuth Subnitrate of Commerce.—P. Carles warns pharmacists against the partiality that they accord to light bismuth subnitrate, and reminds them that in order that the heavy bismuth subnitrate, that is to say, the normal, may exert all its efficiency, it is necessary that it should be administered only in a state of intimate division. The light subnitrate contains a certain quantity of carbonate, which sufficiently explains the relative lightness of the product and its poverty in nitric acid. When the therapeutic action of bismuth subnitrate is closely studied, it is evidently not a matter of indifference that the proportion of nitric acid is small.—Jour. Pharm. Chem., 1894, 202.

Bismuth-Subnitrate and the Teeth.—D. B. Dott states that bismuth subcarbonate is preferable to the subnitrate from a dental point of view. The latter is, a chemically basic but practically acid salt, and its particles lodge about and injure the teeth. A piece of marble about the size of a tooth was placed in subnitrate of bismuth moistened with water. After twenty-four hours it was removed, washed, dried and weighed. It had lost in weight seven Mgm. Replaced in the bismuth paste, and after twenty-four hours again weighed, it had lost five Mgm. Next day it had similarly lost

four Mgm. The same experiment was repeated with subcarbonate, and after twenty-four hours no loss was indicated. Even after four days in the moist subcarbonate there was no weighable loss.—Bull. Pharm., 1894, 269.

Bismuth Sulphite.—This is prepared by reaction between neutral bismuth nitrate* and sodium sulphite, according to the following:

$$2Bi(NO_3)_3 + 3NA_2SO_3 = Bi(SO_3)_3 + 6NaNO_3.$$

The therapeutic value of this preparation is based on the action produced by the generation of sulphuretted hydrogen, which arises from the sulphurous acid which is set free in the system. The bismuth sulphite acts as an antiseptic, antifermentive, antiputrescent, hence its use would be indicated in treatment of abnormal fermentive disturbances in the stomach or intestines.—Bull. Chim. Farm., 10, 1894.

Bismuth Salts.—B. Fischer and B. Grützner.—After reviewing the past work on "bismuthum salicylicum," all of which shows the variability of the commercial product, the authors recommend the following method of obtaining a basic bismuth salicylate of constant composition, namely, $BiO.C_7H_5O_3$. Crystallized bismuth nitrate is dissolved in about four times its weight of dilute acetic acid (concentration not stated). The solution is diluted with about 40 times its weight of water, and the bismuth precipitated as hydroxide by the addition of ammonia. The precipitate is washed and mixed with a molecular proportion of salicylic acid. After a heating of some duration on the water-bath, a magma of crystals of basic bismuth salicylate is formed. This is drained and dried, first on a porous tile and then in the air-bath at 70–75°. The preparation is a dry, electrical, white powder, consisting of microscopic prisms, reddening moistened blue litmus only after a time. The salicylic acid can be detected in cold water, in which the powder has been shaken. Bismuth subgallate (dermatol) $C_6H_2(OH)_3.COO.BI(OH)_2$ may be prepared by a similar method from bismuth hydroxide and gallic acid. It is a sulphur-yellow powder, which does not part with gallic acid either to alcohol or to hot water.—Arch. der Pharm., 1894, 680.

Bismuth Salts.—B. Fischer and B. Grützner prepared basic bismuth salts by heating freshly precipitated bismuth hydroxide with the respective acids. Basic bismuth paracresotate, $C_7H_7O.COO.BiO$, and the metacresotate, both form needles similar in all respects to salicylate. No definite basic salts could be obtained from anisic, benzoic or cinnamic acids. The tartrate, $C_4H_4O_6,2Bi(OH)_2$, forms an amorphous, electrical, white powder. Attempts to prepare the basic nitrate by the action of the calculated quantlty of a 5 per cent. alcoholic solution of nitric acid on freshly

* Crystallized bismuth nitrate, from which all moisture and adhering acid has been removed by drying on filter-paper, is dissolved in a little glycerin, and then mixed with water.

precipitated bismuth hydroxide were sometimes successful and sometimes not. The authors were unable to find out the conditions necessary to ensure a successful result.—Arch. der Pharm., 1894, 460.

CADMIUM SALICYLATE.

Cadmium Salicylate.—This salt is prepared by acting upon oxide of cadmium with salicylic acid. The oxide is moistened first to convert it into hydrate; or barium salicylate is precipitated by cadmium sulphate. The resulting salt is, when quite pure, a white crystalline body, with a sweetish odor. It melts at 300° C., and dissolves in 24 parts of water at 100°. It is insoluble in chloroform and benzene. It corresponds to the formula $(C_6H_4(OH)COOH)_2Cd$., and contains 29 per cent. of metallic cadmium. It is a strong antiseptic.—Rep. de Pharm., 1894, 421.

CÆSIUM.

New Cæsium Salts.—Cæsium bromide forms a white crystalline mass, easily soluble in water. Cæsium bitartrate $CsHC_4H_4O_6$ forms colorless prismatic crystals. They are both on the market as new remedies. The latter is used in nervous palpitation. Dose, 3 to 5 grains three times a day.—Merck's Report, 1894, 47.

CALCIUM.

Calcium Borate.—Calcium borate is prepared by mixing solutions of sodium borate and calcium chloride. It forms a white, inodorous and comparatively tasteless powder. Employed externally it forms a valuable deodorant and antiseptic. Internally it is employed in treatment of diarrhœa of children. Its antiseptic value depends upon its decomposition in the system.—Rép. de Phar., 1894, p. 50.

Calcium Borate.—Alberts.—This salt, which exists as a white powder, soluble in solutions of calcium chloride or of borax, may be used, according to the author, with advantage in the form of ointment in the treatment of burns, moist eczema, and fetid perspiration. Internally it is said to be an excellent anti-diarrhœic for children. It may be exhibited as follows: For external use, borate of calcium, 5 parts; glycerin, 5 parts; lanolin, 20 parts; balsam of Peru, 1 part. Mix. Internally, borate of calcium, 50 Cgms.; powdered salep, 20 Cgms.; sugar, 30 Cgms. A child of 5 years may take three such powders daily. Speaking generally, the dose of borate of calcium in such powder should be as many decigrams as the child is years old.—Pharm. Jour. Trans., 1895, 1115.

Action of Water on Bicalcium Phosphate.—A. Joly and E. Sorel.—When crystals of hydrated bicalcium phosphate are thrown into boiling water, they become opaque, and the liquid, which is acid to litmus, but neutral to methyl-orange, contains monocalcium phosphate, whilst the insoluble matter, which has become amorphous, is almost pure tricalcium phosphate.

The conversion into tricalcium phosphate is made complete by repeated treatment with boiling water.—Compt. rend., 1894, 738.

Basic Calcium Salts.—Tassilly.—When three parts of calcium oxide are added in succesive small portions to a solution of 100 parts of calcium bromide in 75 parts of hot water, the filtered liquid, on cooling, deposits acicular crystals of the oxybromide $CaBr_2,3CaO + 16H_2O$, which may be washed with a 25 per cent. aqueous solution of calcium bromide. The oxybromide previously described may be more advantageously prepared in the same way as the oxybromide. The oxybromide and oxyiodide are decomposed by water, alcohol, carbonic anhydride, and the stronger acids. The hydracids and very dilute nitric acid dissolve them readily, and sulphuric acid converts them into sulphates.

$CaBr_2,3CaO,16H_2O + 6HBr$ dil.....develops + 63.55 Cal.

And hence—

$CaBr_2 + 3CaO + 16H_2O$ liquid .....develops + 98.85 Cal.
$CaBr_2 + 3CaO + 16H_2O$ solid .....develops + 76.45 Cal.

Further—

$CaI_2,3CaO,16H_2O + 6HI$ dil .....develops + 63.4 Cal.

Hence—

$CaI_2 + 3CaO + 16H_2O$ liquid.....develops + 102.3 Cal.
$CaI_2 + 3CaO + 16H_2O$ solid.....develops + 79.3 Cal.

It is noteworthy that the heat of dissolution of the oxy-salt in the corresponding hydracid is practically identical in the three cases, but the heat of formation from the proximate constituents increases with the atomic weight of the halogen.—Compt. rend., 1894, 371.

Calcium Oxide in Quicklime.—W. E. Stone and F. C. Schenck find that the results by the sucrose method were slightly lower than in the gravimetric method, this discrepancy being due to a small amount of calcium carbonate present in the sample. In quicklime which had become partially slacked this discrepancy would be still greater, since the sucrose method would indicate only the actual calcium oxide.—Chem. News, 1894, 278.

Chlorinated Lime.—C. H. LaWall (Amer. Jour. Pharm., 1895, 203), gives results from several careful experiments upon the practicability of completely exhausting a given sample of chlorinated lime.

The first trituration extracted less than the second, and the available chlorine remaining in the residue amounted to about 10 per cent. of the total.

	Per Cent.
The total available chlorine in the sample was taken as	100.00
Amount extracted by first trituration	33.28
Amount extracted by second trituration	44.58
Washings of residue extracted	14.41
Available chlorine determined in residue	11.04
Total	99.31

Working with the two processes simultaneously, and using chlorinated lime of the same strength in both instances, the writer was unable, in any case, to obtain a product by the 1890 process, which contained as much available chlorine as that made by the 1880 process. This appears to be due, in a great measure, to the two operations of filtration which are embodied in the present official process, and in both of which cases the residue is very difficult to exhaust completely. Given the same degree of care and attention, the 1880 process affords a better preparation in a shorter time.

CARBON.

Some Properties of Carbon Bisulphide.—H. Arctowski.—At 130° mercuric chloride is fairly soluble in carbon bisulphide. At 8°, 100 parts of saturated carbon bisulphide solutions of mercuric chloride, bromide and iodide contain 0.030, 0.122 and 0.238 parts of the respective salts. The following salts, HCl, KBr, KS, KNO_3, K_2SO_4, $KSbO_3$, Na_2CO_3, Na_3PO_4, NH_4Cl, $(NH_4)_2SO_4$, $(NH_4)_2CO_3$, $AgNO_3$, AgI, $MgCl_2$, $MgSO_4$, CdI_2, $SnCl_2$, $PbCl_2$, PbI_2, $Pb(NO_3)_2$, CuI, HgCl, $ZnCl_2$, Cr_2Cl_6, Al_2Cl_6, are insoluble, and HgI and Fe_2Cl_6 only very slightly soluble. Boiling carbon bisulphide, however, dissolves $HgNO_3$, and also $Pb(NO_3)_2$ to a slight extent. Sidot's method of purifying carbon bisulphide is the best. The liquid is shaken with mercury until all marked ethereal odor has disappeared, decanted, and slowly distilled. It is best to purify only small quantities at a time, and these immediately before use. The pure liquid boils at 46.27°, under 756 Mm. pressure, and is almost free from smell. It remains pure when kept at the ordinary temperature in the absence of light, air and moisture, but under other circumstances very readily undergoes slight decomposition.—Zeit. f. anorg. Chem., 1894, 255.

Carbon Boride.—H. Moissan.—Carbon boride is formed when the electric arc is allowed to pass between two carbons agglomerated by means of a solution of boric acid and aluminum silicate, or when boron is placed in the electric arc; but much larger quantities can be obtained by heating a mixture of 66 parts of amorphous boron and 12 parts of carbon from sugar in the electric furnace for six or seven minutes with a current of 250–300 amperes and 70 volts. It forms a black, graphitoidal mass with a brilliant fracture, and after prolonged treatment

with fuming nitric acid, followed by potassium chlorate and nitric acid, a crystalline powder remains.—Compt. rend., 1894, 556.

Popular Method for Estimating Carbon Dioxides in Air.—J. B. Cohen and G. Appleyard.—The method depends upon the fact that if dilute lime water, colored with phenolphthalein, containing insufficient lime to combine with the carbon dioxide present, is shaken with the sample of air, the rate of absorption of the gas will vary with its volume. The time required to decolorize the indicator will therefore give the quantity of dioxide present.—Chem. News, 1894, 111.

Cerium Compounds.—L. M. Dennis and W. H. Maga, having obtained considerable quantities of allanite, intend to carefully investigate the derivatives of cerium. For the separation of cerium from the other earths of this group, the best method is a modification of Debray's fusion with potassium nitrate. When employing potassium nitrate, the fusion point of the mixed nitrates is about 325°, and at this temperature traces of didymium nitrate are always decomposed, so that the insoluble cerium oxide left after treatment of the melt with water always contains didymium. The authors substitute a mixture of potassium and sodium nitrates, in molecular proportion, for the potassium nitrate. Such a mixture melts at 231°. By this means the melting point of the mixed nitrates was reduced below 230°, and the decomposition could be carried out at 300°. No didymium nitrate was then decomposed, and the cerium oxide obtained after each fusion was free from impurity. After trial of the various qualitative tests for cerium, the authors recommend Cleve's and Boisbaudran's method for adding excess of ammonia, and then hydrogen peroxide, to the solution. The orange precipitate or coloration can be detected with as little as 0.005 Mgm. of cerium oxide.—Zeit. f. anorg. Chem., 1894, 250.

CHLORINE.

Preparation of Chlorine for Laboratory Purposes.—F. A. Gooch and D. A. Kreider (Chem. Ztg., 1894, 222) describe a method of obtaining chlorine from hydrochloric acid and potassium chlorate, which is best executed by using acid of the specific gravity of 1,100, heating it up to 60–70° C., and slowly bringing it into contact with pieces of fused potassium chlorate, in a Kipp's apparatus, the lower chambers of which are surrounded with a metal tube through which steam is passed. To prepare pure chlorine, the evolved gas is washed in a hot wash-bottle containing a saturated solution of manganous chloride in hydrochloric acid.

The Chlorine, Called Organic, of the Gastric Secretion.—H. Lescoeur.—The chlorine liberated from the gastric secretion by heat, in the state of hydrochloric acid, and taken as a whole, is capable of precise determinations and seems to have a simple physiological signification. But the distinction between free hydrochloric acid and hydrochloric acid in a feeble

combination, and altogether the notion of organic chlorine, is far from having the same simplicity. It will be remarked that the notion of organic chlorine, introduced into the chemistry of urine by the application of the method of Hayern and Winter to its analysis, has disappeared in consequence of the more accurate analysis of Petit and Terreil.—Compt. rend., Vol. cxix, No. 22.

COPPER.

Reaction of Copper Salts.—H. Thoms.—If to a solution of cupric sulphate in 200,000 parts of water, which is too dilute to give a visible coloration with potassium ferrocyanide, potassium iodide is added, a yellow coloration is produced, becoming violet with starch paste. The latter coloration is visible even with 500,000 parts of water.—Zeit. f. Anal. Chem., 1894, 464.

Blue Copper Acetate—Preparation of.—C. Astre.—Wöhler states that these blue crystals are easily obtained by crystallizing a solution of verdigris acidified with acetic acid. The author finds, however, that they are only formed when the density of the solution at 15° is 1.150 or above. In solutions of slightly lower density, a mixture of blue and green crystals is formed, and in those of less than 1.10, only green crystals. The blue crystals also form when moist verdigris is exposed to low temperatures.—Jour. Pharm. Chim., 1894, 542.

Action of Copper Sulphate and Sulphuric Acid on Metallic Copper.—A. Schuster gives details of some experiments performed a few years ago, but hitherto unpublished, which prove that when copper is placed in a copper sulphate solution containing free sulphuric acid, and the tubes exhausted of air, the diminution in the weight of the copper is quite insignificant compared to what takes place in the presence of air. A similar behavior is noticed in sulphuric acid alone.—Proc. Roy. Soc., 1894, 84.

Estimation of Arsenic in Copper.—F. Platten.—The metal is heated, as usual, with ferric oxide and hydrochloric acid. The distillate is precipitated with hydrogen sulphide, and the impure arsenous sulphide is collected. Instead of directly weighing it, it is boiled for some time with about half a litre of water, and after cooling, the arsenic is titrated with centinormal iodine solution in the usual manner.—Jour. Soc. Chem. Ind., 1894, 324.

Detection and Estimation of Small Quantities of Arsenic in Copper.—F. A. Gooch and H. P. Mosely.—The estimation is based on a method described by Sanger, whereby the mirror of arsenic obtained is compared with a series of standard mirrors. Not more than 1 Gm. of the copper is dissolved in dilute nitric acid, 2 to 3 Cc. of strong sulphuric acid is added and the solution evaporated until fumes of sulphuric acid are evolved. The concentrated residue is then distilled with strong hydrochloric acid

and potassium bromide, and the distillate collected in dilute hydrochloric acid. The distillate is again distilled with a fresh quantity of potassium bromide, and the final distillate is treated with a small quantity of stannous chloride dissolved in hydrochloric acid, in order to convert any free bromine into hydrobromic acid; it is now ready for the Marsh's apparatus. The results obtained by the authors show that 0.05 Mgm. of arsenic may be determined by this process with fair accuracy, and they give the results of analyses of commercial copper containing from 0.01 to 0.0005 per cent. of arsenic.—Zeit. f. anorg. Chem., 1894, 127.

Sensitive Reaction of the Cupric Compounds.—P. Sabatier has made known the extremely intense coloration obtained in dissolving a little cupric bromide in hydrobromic acid. He has shown that this coloration is due to a purple cupric hydrobromate formed in the liquid. An identical coloration is produced by traces of any cupric salt, whence there results a very sensitive method for the recognition of cupric salts. If to 1 Cc. of concentrated colorless hydrobromic acid we add a single drop of cupric solution containing 1 atom copper in 4 litres, we observe a very brilliant purple tint. With a drop of a solution 100 times more dilute, the color is lilac. It is still appreciable for a liquid containing only one part of copper in 30,000 parts of water. The presence of free bromine in the liquid greatly diminishes the sensitiveness of the reaction. In this case the color will appear after ebullition. This reaction is more sensitive than any other test for copper. If the copper is in the cuprous state a trace of bromine is added, and the liquid boiled to expel excess. The presence of small quantities of gold, nickel or cobalt does not interfere. Ferric compounds are more troublesome. In such cases the copper is deposited on a plate of platinum by means of electrolysis. The deposit obtained is moistened with a drop of nitric acid, then with sulphuric acid, heated gently to dryness, and finally treated with hydrobromic acid.—Bull. Soc. Chim. de Paris, 1894, 683.

Detection of Arsenic when associated with Antimony and Tin.—F. A. Gooch and B. Hodge.—The mixture containing the three metals is distilled with 3 Gm. of potassium iodide dissolved in 5 Cc. of water and an equal volume of strong hydrochloric acid. The distillate is condensed in 10 Cc. of dilute hydrochloric acid (1 : 1). The free iodine is removed by the cautious addition of stannous chloride, and the arsenic is then precipitated by hydrogen sulphide. Traces of antimony, which may have passed over, and the added tin, are not precipitated in presence of such a large excess of acid. If it be desired to completely remove the arsenic, the residue in the flask must be distilled a few times more with hydrochloric acid. The remaining liquid is afterwards tested for tin and antimony in the usual manner. The apparatus employed is essentially the one devised by Mohr, and consists of a 25 Cc. flask, fitted by means of a rubber stopper to a pipette, bent, drawn out at the lower end and dipped into

a test tube, which is at the same time supported and cooled in a flask partly filled with water. The pipette tube should be wide enough to prevent the formation of bubbles within it, and the bulb large enough to retain any liquid which may happen to force itself back by accidental cooling of the flask.—Amer. Jour. Sci., 1894, 382.

HELIUM.

Helium.—In seeking a clue to compounds of argon, W. Ramsay (Chem. News, lxxi., 151) was led to repeat experiments of Hillebrand on cleveite, which, as is known, when boiled with weak sulphuric acid, gives off a gas hitherto supposed to be nitrogen. This gas proved to be almost free from nitrogen; its spectrum in a Pfluecker's tube showed all the prominent argon lines, and, in addition, a brilliant line close to, but not coinciding with, the D lines of sodium. There are, moreover, a number of other lines, of which one in the green-blue is especially prominent. Atmospheric argon shows, besides, three lines in the violet which are not to be seen, or, if present, are excessively feeble, in the spectrum of the gas from cleveite. This suggests that atmospheric argon contains, besides argon, some other gas which has as yet not been separated, and which may possibly account for the anomalous position of argon in its numerical relations with other elements. Ramsay sent a tube of the gas to Crookes, who has identified the yellow line with that of the solar element to which the name "helium" has been given.

HYDROGEN.

Concentration and Distillation of Hydrogen Peroxide.—R. Wolffenstein. —Hydrogen peroxide is relatively stable when heated, provided that the solution is free from alkaline compounds, from derivatives of the heavy metals, and from solids of every kind, even those that are chemically indifferent. Commercial hydrogen peroxide, 3 per cent., can be concentrated on the water-bath in an ordinary dish at 75°, until it contains 47.7 per cent. The yield is 61.8 per cent., the loss is due to volatilization, and not to decomposition, for, by the use of a beaker instead of a dish, the yield is 56 per cent. of solution, containing 64.7 per cent. of hydrogen peroxide. These solutions may be concentrated by distillation under reduced pressure, either direct or, preferably, after extraction with ether, to remove alumina. After repeated fractionation, almost pure (99.1 per cent.) hydrogen peroxide was obtained. It boils at 84–85° (68 Mm.), is a colorless, syrupy liquid, does not readily moisten the containing vessel, is volatile in air, and irritates the skin, producing white marks which remain several hours. It is strongly acid, and, when neutralized with alkali and distilled, the distillate readily reddens litmus. The preparation of large quantities of the pure peroxide is best accomplished by concentrating the commercial solution on the water-bath until it contains about 20 per cent.; it is then evaporated under reduced pressure (68 Mm.) until it contains

50–55 per cent., extracted with ether, and finally fractionated in a vacuum. The percentage of peroxide in the various solutions was determined by titration with potassium permanganate solution. The author is unable to confirm Schilow's statement that a solution of peroxide containing 50 per cent. can be prepared by treating the commercial product (3 per cent.) with soda and extracting with ether. The hydrates $H_2O_2 + H_2O$ and $H_2O_2 + 2H_2O$ have also been prepared; they are liquid at 20°, but solidify in a mixture of solid carbonic anhydride and ether.—Ber. d. Chem. Ges., 1894, 3307.

Hydrogen Peroxide as a Preservative.—According to Barbi (Pharm. Centralh., xxxvi., 307), hydrogen peroxide is one of the best, least harmful and most convenient agents for preserving syrups, wine, beer, cider, and vinegar. For this purpose 10 Gm. of the commercial peroxide of hydrogen may be added to each liter of the article to be preserved.

Occurrence of Hydrogen Peroxide in the Air.—L. Ilosvay de N. Ilosva.—In reply to Schöne the author maintains that, owing to the presence of nitrogen peroxide as a constant constituent of the atmosphere, the evidence hitherto brought forward to establish the presence of ozone and hydrogen peroxide in the air or in rain water, is insufficient. The oxidizing effects which have been observed are all due to this agent, and when this is removed, no evidence of the presence of any other oxidizing agent more powerful than free oxygen can be found.—Ber. de Chem. Ges., 1894, 920.

Atmospheric Hydrogen Peroxide.—E. Schöne.—A reply to Ilosva's paper on this subject. Exception is taken to the statements that nitric peroxide is a constant constituent of air, and is the oxidizing agent in it. The chief question at issue is one of fact, namely, whether potassium iodide, starch, ferrous sulphate, and guaiacum diastase solution are characteristic reagents for hydrogen peroxide, and although Ilosva denies this, the author has recently furnished detailed experimental proof in support of this assertion. In addition to hydrogen peroxide, organic peroxides, such as percarbonic acid, are probably present in the atmosphere; they are formed by plants in the presence of sunlight.—Ber. d. Chem. Ges., 1894, 1233.

Formation of Hydrogen Phosphide.—J. W. Retgers.—Based on some very old experiments of Fourcroy and Vauquelin, the text books state that free hydrogen can be made to combine directly with phosphorus. The author finds that if a stream of hydrogen is passed over heated amorphous phosphorus, gaseous hydrogen phosphide is formed. The liquid and solid compounds are, at the same time, produced in small quantities.—Zeit. f. anorg. Chem., 1894, 265.

Dissociation of Water.—W. Nernst points out that in the determination of the electrolytic dissociation of water by Ostwald, the differences of potential between the acid and base employed must not be neglected. He calculates this to be about 0.065 volt, and hence finds the dissociation to be 0.8×10^{-7}.—Zeit. Physikal Chem., 1894, 155.

IODINE.

Purity of Iodine Sold as Resublimed Iodine.—C. O. Curtman (report No. 8. of the Research Committee B. of U. S. Pharmacopœia) has examined specimens obtained from six different firms and found them to be of a grade higher (minimum 99.75 per cent.) than that demanded by the U. S. Pharmacopœia.

Estimation of Chlorine in Commercial Iodine.—F. Ulser and A. Friedreich.—10 to 20 Gm. of the sample is dissolved in 100 Cc. of carbon bisulphide in a separator. 5 to 10 Cc. of water is added and shaken. The iodine chloride dissolves in the water, which also becomes saturated with iodine. A standard solution of potassium iodide is now run in. This, reacting with the iodine chloride, causes a liberation of iodine, which appears as a turbidity in the aqueous layer, and the addition is continued until it no longer produces turbidity.—Zeit. f. anal. Chem., 1895, 595.

Solubility of Iodine in Carbon Bisulphide—Nature of Solution.—H. Arctowski has determined the solubility of iodine in carbon bisulphide at a series of temperatures lying between —94° and +42°.—Zeit. f. anorg. Chem., 1894, 392.

IRON.

Iron Boride (FeB_2) has been prepared by H. Moissan (Comptes Rend., cxx, 173) by melting together in an electric furnace boron and iron. After the fused mass has cooled it is treated with diluted hydrochloric acid, to remove uncombined iron, iron boride being insoluble in that acid. It is described as yellowish-gray crystals of a density of 7.15 at 18° C. It is suggested that the borides might furnish useful data for determining the valency of the elements concerned.

Effervescent Iron Citrate.—Rondo (Pharm. Wochenschr., 1894, 362) recommends the following well-tried procedure for preparing a yellow, effervescent citrate of iron: Take

Iron and ammon. citr	5 parts,
Sodium bicarbonate	50 parts,
Citric acid	40 parts,
Powdered sugar	100 parts,

all thoroughly dried powders. Dissolve the iron salt in 2 parts of water, and to the solution add 5 parts of citric acid and 10 of alcohol. Now moisten the mixture of the remaining powders with 6 parts of alcohol, add the alcoholic ferric-citrate solution, triturate until the mixture has become uniformly yellow, and press through a well-tinned sieve No. 3.—Chem. Zeit., 1894, 286.

Soluble Iron and Quinine Citrate.—F. A. Sieker in preparing this salt on a large scale uses a solution of ferric citrate instead of the scaled salt. For every 14 to 14½ parts of iron contained in the solution 12 parts of quinine

are added. The quantity of citric acid necessary will depend upon the relative proportion of acid and iron present in the solution of ferric citrate employed. After the solution of the alkaloid has been effected, ammonia is added until a green color is produced. Control tests are applied. When the solution is of proper strength, the not too concentrated solution is spread quite thin and dried at 35 to 40°C.

Composition of market preparations show that they now contain about the required amount of quinine.—Pharm. Rund., 1895, 36.

LEAD.

Precipitation of Pure Lead.—Sanderens states (Chem. Centralb.), that when a brightly polished rod of metallic lead is dipped into a neutral solution of plumbic nitrate, the metal becomes covered with a blackish layer, and finally small leaves of pure lead make their appearance. Other metals are not thus acted upon, and the experiment cannot be performed with plumbic acetate. While the above-mentioned precipitation is going on the liquid turns yellow, owing to the presence of a basic nitrate formed by reduction of the plumbic nitrate.—Brit. and Col. Drug., 1894, 267.

MAGNESIUM.

Crystallized Normal Magnesium Carbonate.—K. Kippenberger.—If freshly precipitated magnesium carbonate, made by mixing equivalent amounts of magnesium sulphate and sodium carbonate, is shaken with a solution of potassium hydrogen carbonate at the ordinary temperature, much of the magnesium carbonate dissolves and crystallizes out of the filtered solution after a time; the separation is ended in 24 hours. The same occurs if sodium hydrogen carbonate is used; it dissolves relatively more of the magnesium carbonate, but the crystals obtained are smaller.—Zeit. f. anorg. Chem., 1894, 177.

New Method for the Volumetric Estimation of Magnesium.—G. Venturoli.—On treating a solution of a magnesium salt with disodium hydrogen phosphate, magnesium hydrogen phosphate is formed; this is converted, by boiling, into a mixture of trimagnesium diphosphate and magnesium tetrahydrogen diphosphate, $4MgHPO_4 = Mg_3(PO_4)_2 + MgH_4(PO_4)_2$. Since the latter salt has an acid reaction, its quantity can be determined by titration with standard alkali solution. A concentrated aqueous solution, containing about 45 parts of disodium hydrogen phosphate for every part of magnesia to be estimated, is boiled, a little phenolphthalein being added; during the boiling the neutral magnesium solution is run in until the red tint vanishes. The solution is then titrated with decinormal soda solution until the red color reappears, care being taken not to add soda solution after the appearance of the pink tint. The quantity of magnesium in the solution added to the phosphate can then be calculated, knowing that two mols. of magnesia, MgO, are equiva-

lent to 1 mol. of soda, NaHO. The process may also be employed for the estimation of calcium.—Gazzetta, 1894, 314; Jour. Chem. Soc., 1894, 332.

Magnesium Ricinoleate is the name given by Stockman and Dott to a salt which probably contains all the acids of castor oil. The magnesium salt was prepared as follows: Castor oil was completely saponified by treatment with caustic soda in slight excess. The soda soap was then treated with excess of boiling solution of magnesium sulphate, whereby, by double decomposition, the ricinoleic acid passes into combination with the magnesium. The magnesium compound was washed repeatedly with cold water, dried and powdered. The authors suggest that possibly the soda soap might be a useful form for suppositories. About the same bulk is required to produce a therapeutic effect as is required of the oil.—Pharm. Jour. Trans., 1895, 706.

MERCURY.

Iodides of Mercury.—Berthelot refers to the two isomeric forms of iodide of mercury—red and yellow—and remarks that without doubt on the condensation of the vapor of the compound, the yellow iodide is directly formed, but contact with the least trace of the red iodide suffices for the conversion of the whole into the more permanent state. It must be considered, therefore, that the yellow iodide is only stable at the temperature at which the vapor condenses. On cooling to the ordinary temperature it becomes so unstable that contact with the normal crystals is sufficient to determine the transformation of the yellow into the red compound.—Pharm. Jour. Trans, 1894, 172; Bull. de la Soc. Chim. de Paris [3], xi., 748.

Mercury Sulphates.—R. Varet gives some interesting illustrations of the interdependence of chemical and physical factors. Thus, he shows that when water acts upon sulphate of mercury more heat is produced than with any other reaction of the latter, and that this exothermic reaction explains why the salt is decomposed into free acid and a basic salt, since in the case of alkaline or metallic salts which are not decomposed by water, the action is endothermic. Again, whilst sulphuric acid displaces the hydrocyanic acid in potasssium cyanide, without precipitation and with the disengagement of heat, which corresponds to the thermal preponderance of the first acid relatively to the base, in the case of mercury it is the hydrocyanic acid which completely displaces the sulphuric acid with a similar disengagement of heat. This reversal of the ordinary conditions between the two acids is precisely similar to what occurs with hydrocyanic and hydrochloric acids, and is in that case explained in the same way by the thermal preponderance of the former acid. Sulphuric acid is also more or less completely displaced from sulphate of mercury by hydrochloric acid, for the same reason.—Pharm. Jour. and Trans., 1894, 353; from Compt. rend., cxix., 684.

Volatility of Mercuric Chloride.—H. Arctowski shows that mercuric chloride is decidedly volatile at the ordinary temperature, and has also determined the volatility at various temperatures from 56° to 125°, keeping the other conditions constant. Taking the temperatures as abscissæ, and the amounts of chloride volatilized as ordinates, a curve is obtained for the relative volatility which is asymptotic to the temperature-axis.—Zeit. f. anorg. Chem., 1894, 167.

Estimation of Mercury in the Presence of Iodine.—Francois.—The estimation of mercury when combined in any form with iodine is easily effected by electrolysis. The salt need not be dissolved, but merely placed in the electrolyzing vessel with the electrolyte. The latter may be dilute sulphuric acid, but the author finds the best electrolyte for this purpose to be formed by dissolving 20 Gms. of pure ammonium nitrate in concentrated pure ammonia, and making up with the latter to 100 Cc. The electrolysis is carried out in a platinum crucible, of which the bottom is connected with the negative pole of the battery (two Bunsen cells). The positive pole is formed by a platinum rod, of which only about 1 Mm. dips into the liquid. The mercury is deposited on the bottom of the crucible. When the action is finished, the solution is removed with a pipette, and the mercury is washed first with water and finally with alcohol, dried and weighed with the crucible. The iodine in the solution is reduced with sulphurous acid, and estimated as silver iodide. This process may also be used for estimating mercury in the presence of bromine or chlorine.—Jour. Pharm. Chim., 1894, 249.

The Molecular State of Calomel Vapor.—W. Harris and V. Meyer.—After enumerating the experiments of previous observers, the authors describe some new ones which they have made. A sheet of gold leaf, dipped for a moment in calomel vapor, becomes amalgamated; if held there longer, the coating of mercury evaporates. A thermometer immersed in rapidly evaporating calomel indicated 357°, a temperature very nearly that of boiling mercury. The rate of volatilization of calomel in different temperatures was approximately determined, and the vapor density at 448° and at 518° was found, by V. Meyer's method, to correspond with the constitution HgCl or $Hg + HgCl_2$. The same vapor density was obtained with a mixture in these proportions of mercury and corrosive sublimate, and, on cooling, calomel was deposited in the apparatus. When calomel contained in a porous cell was heated at 465° inside a test-tube, mercury vapor was found to have diffused through the porous walls, and condensed on the walls of the test-tube, while some mercuric chloride was formed inside the porous cell. Further, if a rod of potash, previously heated to 240–260°, is dipped into the vapor of calomel at the same temperature, it is immediately covered with a yellow coat of mercuric oxide, whereas a black coat of mercurous oxide only begins to turn yellow at this temperature after the lapse of some twenty seconds.

All these facts indicate that calomel as such is not volatile, but that its "vapor" is completely dissociated into mercury and mercuric chloride.—Ber. d. Chem. Ges., 1894, 1482.

"*Stock Calomel*" is the name applied to a commercial commodity of questionable composition. Its sale seems to be confined principally to Texas, where the article is employed in the treatment of wounds on cattle. The article is evidently the outgrowth of the demand for a large quantity in return for a little amount of money, without regard to quality. While pure calomel is required for human beings, there is a feeling that almost anything will do for dumb animals. An investigation reveals the fact that under the name of stock calomel the following mixtures are sold at prices in accordance with the composition: (1) Calomel, one part; white lead, three parts. (2) Calomel, one part; white lead, seven parts. (3) Calomel, one part; flaxseed meal, one part. (4) Calomel, three parts; white lead, two parts. (5) Calomel, one part; sugar, one part. This brings to mind the fact that a number of years ago "horse antimony" was the only black sulphuret of antimony procurable in bulk in the Chicago drug market, and the "antimony" in this was represented by ground anthracite and mica.—Meyer Bros. Drug., 1894, 350.

The Molecular Weight of Mercurous Chloride.—Filoth, referring to a recent paper by Harris and V. Meyer, rejects the formula Hg_2Cl_2, proposed for calomel, as in that case the vapor density should be much nearer 16.28 than 8.16, as actually obtained.—Jour. f. prakt. Chem., Vol. 1, Nos. 3, 4 and 5.

Preparation of Potassium Mercuric Iodide.—E. G. Clayton.—Potassium mercuric iodide is readily obtained from ordinary Nessler solution by concentration and crystallization. Chem. News, 1894, 102; Jour. Chem. Soc., 1894, 449.

The Action of Iodoform on Calomel.—Iodoform and calomel, in equal parts, when freshly prepared, has a clear yellow color. After a time, however, it becomes red on the surface, and after some months the whole mass is one of red crystals. It is found that the whole of the mercury has been transformed into the biniodide, or into a mixture of this and of the chloriodide. Chloroform is formed at the same time, which is easily recognized by its odor. The micro-chemical examination of the mixture is interesting. A drop of iodide of potassium on the slide shows the formation of the double iodide of potassium and mercury. After a few seconds the crystals become powdery and dissolve in the excess of KI, and nothing is seen but oily drops of chloroform. Bichloride of mercury and iodine triturated with alcohol give rise to the chloriodide of mercury, which is known as Boutigny's salt.—Schwessinger in Rep. de Pharm., 1894, 414.

Mercuric and Sodium Chloride in Ethylic Acetate—Solubility of.—C. E.

Linebarger continues his work on this subject, giving a table and a curve of the solubility of mercuric chloride in ethylic acetate in the presence of varying proportions of sodium chloride. Determining the separate solubilities of the two salts, 100 mols. of ethylic acetate at 40° dissolved 16 mols. of mercuric chloride, but only 0.037 mols. of sodium chloride; when, however, a mixture of the chlorides was treated, a solution was obtained which contained 40 mols. mercuric chloride, and 20 mols. of sodium chloride, to 100 mols. of ethylic acetate. The influence of the sodium chloride is first to somewhat reduce the solubility of the mercuric chloride, such influence being greatest when two molecules of sodium chloride have gone into solution in 100 mols. of the solvent (the solubility of the mercuric chloride being then 12 mols. in 100.) The solubility of both salts then increases, at first slowly, then more rapidly.—Amer. Chem. Jour., 1894, 214.

Black Mercury Sulphide and the Red Modification.—W. Spring.—The ordinary black mercury sulphide cannot be converted into the red modification by pressure. Theoretically, it would require a pressure of 35,000 atmospheres. The author has obtained a new black modification of mercury sulphide by subliming ordinary mercury sulphide in the presence of a sufficient quantity of an inert gas. It is a micro-crystalline powder, is converted into the red modification by treatment with yellow ammonium sulphide, and has sp. gr. = 8.0395 at 17°. When subjected to a pressure of 100 atmospheres, it is easily converted into the red modification. The red sulphide, when heated at 250–320°, turns black, but regains its red color on cooling, whether it be cooled slowly or quickly. After being heated at 410°, it, however, remains black on cooling.—Zeit. f. anorg. Chem., 1894, 371.

Mercurous Sulphide.—U. Antony and Q. Sestini.—On passing a stream of hydrogen sulphide through potassium sulphate solution containing mercurous chloride or acetate in suspension, at —10°, a black powder consisting of mercuric sulphide and mercury is deposited. A mixture of dry hydrogen sulphide and carbonic anhydride, however, acts on pure, dry mercurous chloride at —10° with formation of mercurous sulphide; the carbonic anhydride is employed merely to dilute the hydrogen chloride evolved. Mercurous sulphide is also obtained by the action of dry hydrogen sulphide on dry mercurous acetate at —10°, no gaseous diluent being necessary in this case; the salt is stable at —10°, but decomposes into mercuric sulphide and mercury if the temperature rises above 0°. Mercurous sulphide may be distinguished from the mixture of mercuric sulphide and mercury by its behavior towards a mixture of dry hydrogen chloride and carbonic anhydride. On passing these gases over the mixture containing the mercurous salt, no action occurs at either low or ordinary temperatures. At —18° the gas has practically no action on mercurous sulphide; at —12° the salt is slowly converted into mercurous

chloride, whilst at 0° the conversion proceeds rapidly. Above 0° the action becomes more sluggish as the temperature rises, until at +18° no mercurous chloride at all is produced. This is accounted for by the fact that the mercurous salt is completely decomposed into mercuric sulphide and mercury at this temperature. Mercurous sulphide is a black powder which is not affected by the alkali hydroxides, ammonia, ammonium sulphide, or dilute nitric and hydrochloric acids below 0°; fuming nitric acid, however, rapidly oxidizes it. It readily dissolves in sodium or potassium sulphide below 0°, giving a limpid solution which, as the temperature rises, deposits mercury in a very fine state of subdivision.—Gazzetta, 1894, 195; Jour. Chem. Soc., 1894, 318.

NICKEL.

Volumetric Determination of Nickel.—For the titration of nickel, Le Cœuvre recommends the employment of a 10 per cent. potassium cyanide solution, each Cc. of which corresponds to about 22–23 mgm.Ni. The titre of the solution is fixed by a solution of nickel ammonium sulphate. In titrating, the nickel solution is made slightly alkaline by the addition of a 5 per cent. ammonia water, then sufficient of the potassium cyanide solution is added until the slight turbidity has disappeared, which follows upon the addition of the slightest excess of cyanide. The presence of free ammonia or its salt does not interfere with the reaction. If tartrates or citrates are present in large quantities, it is advisable to warm the solution during titration. If iron salts are present it is advisable to add some ammonium tartrate, before the addition of the ammonia water, to avoid precipitation of the iron. This method cannot be employed in solutions of nickel which contain copper, zinc or cobalt.—Pharm. Era, 1895, 363.

NITROGEN.

Assay of Nitre.—A. Hellich has noticed that commercial nitre often contains perceptible quantities of perchlorates, and consequently should be tested for this impurity. Its presence, which is difficult to account for, has until now been ignored in the various schemes for nitre analysis.—Chem. Zeit., 1894, 485.

Indole as a Test for Nitrites.—O. Bujwid.—Indole gives a very delicate and beautiful reaction with traces of nitrites in water analyses. It is best to use a diluted alcoholic solution containing about 0.1–0.2 Gm. of indole per litre. 10 Cc. of the sample of water is mixed with a few drops of hydrochloric acid, and heated to 70–80°. A few drops of the reagent is now added, when, if nitrite is present, a beautiful red coloration is obtained, which in a few minutes will get somewhat darker. The author thinks that the reaction may also be utilized quantitatively.—Chem. Zeit., 1894, 364.

Estimation of Organic Nitrogen by Stock's Method.—C. E. Zay.—The

nitrogen of several substances was determined by Kjeldahl's method (employing 20 Cc. of sulphuric acid containing 200 Gms. of phosphoric anhydride per litre) and by Stock's modification, using manganese dioxide (5 Gms.) with (1) sulphuric acid alone, and (2) with sulphuric acid containing phosphoric anhydride (20 Cc. per litre). Concordant results were obtained, and the employment of manganese dioxide effected a very great saving of time in the decomposition process.—Staz. Sper. Agrar., 1894, 22; Jour. Chem. Soc., 1895, 86.

Nitrous Anhydride.—G. Lunge and G. Porschnew.—These investigations were carried out in order to settle the question of the existence or non-existence of nitrous anhydride in the gaseous state. All conceivable precautions were taken to obtain pure materials for the investigation and to avoid sources of error, and many of the experiments made by previous investigators were repeated with additional precautions. The composition of the nitrogen oxides was determined by absorbing them by sulphuric acid, and either *a*, estimating the total weight and total nitrogen, or *b*, estimating the total nitrogen, and the amount of oxygen (in the form of permanganate) needed for complete oxidation.—Zeit. f. anorg. Chem., 1894, 209.

Chloride and Iodide of Nitrogen.—T. Selivanoff.—The chlorides and iodides of nitrogen are considered by the author to be the amido-derivatives of hypochlorous and hypoiodous acids. Iodide of nitrogen is more probably formed by the action of ammonia on hypoiodous acid, which, along with ammonium iodide, is the first product of the reaction between ammonia and iodine. Ber. d. Chem. Ges., 1894, 1012.

OXYGEN.

Compressed Oxygen.—A correspondent of Nature has recently tested two commercial samples, and found them to be mixtures of 65 per cent. oxygen, and 35 per cent. nitrogen.—Brit. and Col. Drug., 1894, 470.

Influence of Vegetation on Atmospheric Ozone.—The influence of vegetation on the formation of atmospheric ozone has occupied the attention of several observers from time to time, but the results of their investigations are more or less contradictory. As the result of more than 700 observations conducted during the months of July, August, September and October of last year, J. Peyron has definitely formed the opinion that the production of ozone is favored by vegetation. His experiments were performed at different times and in different places, with iodized starch paper, and he finds that the quantity of ozone produced is greatest when the surrounding vegetation is most active. During the whole course of the experiments ozone was found to be present continually, both day and night, in country districts; but in Paris, during October, it was only detected during stormy weather, with its accompanying atmospheric disturbances.—Compt. rend., cxix., 1206.

PHOSPHORUS.

Phosphorus Iodosulphides.—Ouvrard (Chem. and Drug., 1894, 858) has prepared three iodosulphides of phosphorus. The iodide of phosphorus, P_2I_4, is not attacked by sulphuretted hydrogen at ordinary temperatures, but at a temperature slightly higher than the melting-point of the iodide, —about 115° C.—hydriodic acid is slowly produced, and after a couple of days' heating at this temperature the reaction is usually complete. The product is readily soluble in carbon disulphide, and the solution deposits crystals of an iodosulphide of the composition $P_4S_3I_2$. This substance forms very well-developed yellow crystals of high refractive power. They are permanent in dry air, but slowly attacked by moisture with elimination of sulphuretted hydrogen. They melt at 106° C. to a viscous liquid, and at 300° C. they inflame with evolution of iodine vapor and white fumes of phosphoric anhydride. Cold water only slowly attacks them, but they are rapidly decomposed by hot water. Fuming nitric acid at once induces an explosion accompanied by incandescence. The compound may more easily be prepared by dissolving the constitutents in the correct proportions in carbon disulphide, evaporating and heating to 120° C. in a current of inert gas, and again dissolving in carbon disulphide; the solution deposits crystals of the new substance upon evaporation. It may also be at once obtained by dissolving iodine in a solution of sesquisulphide of phosphorus in carbon disulphide, and evaporating.—The second iodosulphide of phosphorus has the composition PSI or $P_2S_2I_2$, and was obtained by the action of sulphuretted hydrogen upon the tri-iodide of phosphorus, PI_3. The solution of the product in carbon disulphide deposits red crystals of the new compound PSI. These crystals are much more rapidly attacked by moist air than those of the first iodosulphide, and the reaction is accompanied by the liberation of fumes of hydriodic acid. They take fire upon warming in the air, disseminating the odor of sulphur dioxide and the violet vapor of iodine. Water dissolves them rapidly, producing trisulphide of phosphorus and hydriodic and phosphorous acids, and sulphuretted hydrogen is subsequently evolved owing to the decomposition of the trisulphide. The third iodosulphide was obtained by reacting with excess of di-iodide of phosphorus upon the trisulphide. It is deposited from carbon disulphide in deep, red crystals, very rapidly decomposed by moist air; and its composition is P_2SI_4. The author has also obtained several new halogen derivatives of the sulphides of arsenic and antimony.

Preparation of Phosphorus.—Hydrogen-ammonium-sodium phosphate is fused in a porcelain crucible until it is changed into sodium metaphosphate; aluminum turnings are then dropped into the liquid, and the freed phosphorus bursts into flame. If the experiment is tried with a glass tube, instead of a crucible, a slow current of dry hydrogen being passed over the mixture of the salt and aluminum, the phosphorus distills into the cooler

part of the tube without the formation of any phosphoretted hydrogen. The residue consists of alumina, sodium aluminate, and a phosphide of aluminum—Al_2P_5. By these steps in the process only 30 per cent. of the phosphorus in the mineral used can be obtained; but the phosphide is decomposed entirely by heating with silica, and this may be added at the beginning of the experiment and the action proceeds without difficulty and without loss. It is advised that for the lecture table a combustion tube a yard long be used; two and a half parts aluminum, six parts of sodium metaphosphate (obtained from heating previously the hydrogen ammonium sodium phosphate) and two parts of finely pulverized silica are placed in the tube, a slow current of hydrogen is passed through, and heat is applied until the reaction begins. This is shown by sudden incandescence, and phosphorus is seen to condense in globules on the cooler part of the tube, at the end where the hydrogen escapes. Instead of this phosphate, any ordinary phosphate may be used.—West. Drug., 1895, 50.

Phosphoric Anhydride.—H. Biltz.—Ammonia reacts energetically with phosphoric anhydride at ordinary temperatures, forming a dark reddish-brown mass, consisting chiefly of phosphanic acid. On treatment with water, hydrogen phosphide is evolved, and yellow phosphorus (0.05 per cent.) is formed, together with a reddish. flocculent substance (0.1–0.2 per cent.). This substance is not red phosphorus, as Schiff stated, but the suboxide, P_4O.—Ber. d. Chem. Ges., 1894, 1257.

POTASSIUM.

Potassium Hydrogen Tartrate—Solubility of.—A. A. Noyes and A. A. Clement.—The influence of several salts on the solubility of potassium hydrogen tartrate was investigated. The salts used were the chloride, chlorate, bromide, iodide, nitrate, acetate, and sulphate of potassium. Blarez's conclusion that potassium salts in equivalent amounts have equal effects in lowering the solubility, appears to be only a first approximation. The authors' experiments show that the three haloids have equal effect; the nitrate has a somewhat smaller effect, the chlorate smaller still, and the sulphate the least of all the salts examined. Acetic acid causes an increase in the solubility. This is explained by the fact that the acetic acid is only slightly dissociated, so that the hydrogen ions from the acid tartrate unite with the acetic acid ions to form undissociated acetic acid. The small effect of potassium sulphate is similarly explained, sulphuric acid being only moderately dissociated. The solubility of the salt is also increased by hydrogen chloride or salts of sodium, owing, in the latter case, to the formation of undissociated sodium salts.—Zeit. f. Physikal. Chem., 1894, 412.

Potassium Hydrogen Tartrate—Dissociation of.—A. A. Noyes.—The dissociation was determined by the inversion of sugar, according to Trevor's method, a platinum tube being employed, and the rate of in-

version compared with that induced by acetic acid. The reaction constant of a 0.0351 solution of potassium hydrogen tartrate was 0.00422; that of a 0.00785 solution of acetic acid was 0.00463; whence if x is the degree of dissociation of the hydrogen atom of the salt, and a that of the acid, 0.00785 a : 0.0351 x = 0.00467 : 0.00422. From the dilution employed a = 4.67 per cent., whence x = 0.944 per cent., and the value for the dissociation constant of the acid ions $H.C_4H_4O_6$ is 0.00012. From these numbers the author deduces the composition of the solution of the salt, which he calculates to contain about 8 per cent. of free undissociated acid.—Zeit. f. Physikal. Chem., 1894, 417.

Solubility of Potassium Hydrogen Tartrate in Alcohol of Various Strengths.—J. A. Roelofsen.—The following table gives the results obtained:

MILLIGRAMS OF POTASSIUM HYDROGEN TARTRATE DISSOLVED IN 10 CC.

Temp.	Alcohol, percentage of.									Water.
	90.	80.	70.	60.	50.	40.	30.	20.	10.	
0°	6.2	6.4	4.9	6.0	6.0	6.2	7.0	10.8	17.3	30.1
5°	5.5	6.0	5.1	6.0	6.8	6.8	7.1	13.2	18.8	32.0
10°	6.2	6.2	5.1	5.8	6.4	7.0	8.6	16.0	27.0	41.1
15°	5.3	6.2	6.2	6.2	5.5	7.7	8.8	15.8	23.9	44.3
20°	6.4	6.4	6.2	6.4	7.0	9.6	11.3	17.1	29.3	49.0
25°	4.7	5.5	6.0	6.8	7.0	10.3	11.7	21.4	36.4	54.1
30°	4.7	6.0	6.8	7.5	8.5	11.0	13.1	24.8	39.9	69.2
35°	1.9	5.1	5.9	6.8	9.0	12.4	18.8	28.7	49.3	83.8
40°	1.7	5.3	5.8	7.0	10.2	14.9	23.1	37.7	53.6	95.9
45°	1.7	5.3	6.0	7.9	10.7	16.5	25.8	44.2	72.6	112.8
50°	1.5	5.1	6.0	8.1	12.8	19.0	29.7	53.6	87.2	124.8

—Amer. Chem. Jour., 1894, 464.

Potassium Arsenite Sulphate.—A. Stavenhagen, some time ago, investigated compounds of arsenic trioxide with sulphuric anhydride, and has now succeeded in preparing a double salt of potassium sulphate with potassium arsenite. 21.8 Gm. of potassium sulphate and 3 Gm. of potassium ortharsenite were dissolved in 85 Cc. of water, evaporated to the crystallizing point, and slowly left to crystallize. The double salt separated as small lustrous prisms, showing hexagonal forms when viewed under the microscope. Analysis proved its formula to be $K_3AsO_3 10K_2SO_4$.—Zeit. f. angew. Chem., 1894, 165.

Preparation of Potassium Ferricyanide.—M. S. Walker.—26 Gms. of potassium ferrocyanide are dissolved in 200 Cc. of cold water, 8 Cc. of strong hydrochloric acid added, and then a solution of 2 Gms. of potassium permanganate in 300 Cc. of water until oxidation is complete. On

neutralizing with chalk or barium carbonate, and evaporating, crystals of the pure ferricyanide are obtained.—Amer. Chem. Jour., 1895, 68.

Potassium Iodide and Potassium Bromide.—G. W. C. Klie in a paper before the Missouri Pharmaceutical Association, June, 1894, considers these salts of the market, and finds that the large majority do not conform to the requirements of the Pharmacopœia.

Potassium Chlorate Manufacture.—An improvement in manufacture (F. Hunter) consists in electrolyzing the solution of potassium chloride in a metallic vessel which forms the outside. This is coated inside with a mixture of Portland cement, salt, sand and water, which forms a porous diaphragm. The anode consists of a sheet or sheets of platinum.—Jour. Soc. Chem. Ind., 1894, 810.

Sodium and Potassium Phosphides.—A. Joannis is reported (Pharm. Journ. and Trans., 1894, 353) to have obtained a compound of the formula PH_2K, by passing phosphuretted hydrogen into an ammoniacal solution of potass-ammonium. This potassium phosphide occurs in fine white needles, and is analogous to potassium amide, NH_2K. In a similar manner the author was able to prepare sodium phosphide, PH_2Na, from sod-ammonium, as a white solid. Heat decomposes the compounds as follows: $3PH_2K = 2PH_3 + PK_3$. Water also decomposes them, with liberation of phosphuretted hydrogen; and when their ammoniacal solutions are treated with nitrous oxide, a quantity of nitrogen is liberated equal in volume to the nitrous oxide employed.—Compt. rend., cxix, 537.

SILVER.

Solubility of Silver Chloride, Bromide, and Iodide in Inorganic and Organic Solvents.—E. Valenta gives his results obtained in the following table:

Solvent.	Concentration.	100 Gm. of solution contain in Gm.		
		AgCl.	AgBr.	AgI.
$Na_2S_2O_3$	1 : 100	0.40	0.35	0.03
	5 : 100	2.00	1.90	0.15
	10 : 100	4.10	3.50	0.30
	15 : 100	5.50	4.20	0.40
	20 : 100	6.10	5.80	0.60
$(NH_4)_2S_2O_3$	1 : 100	0.57		
	5 : 100	1.32		
	10 : 100	3.92		
Na_2SO_3	10 : 100	0.44	0.04	0.01
	20 : 100	0.95	0.08	0.02
$(NH_4)_2SO_3$	10 : 100	trace	trace	trace
$(NH_4)_2CO_3$	10 : 100	0.05		
NH_3	3 : 100	1.40		
	15 : 100	7.58		
$MgCl_2$	50 : 100	0.50		
KCN	5 : 100	2.75	6.55	8.23
NH_4SCN	5 : 100	0.08	0.21	0.02
	10 : 100	0.54	2.04	0.08
	15 : 100	2.88	5.30	0.13
KSCN	10 : 100	0.11	0.73	
$Ca(SCN)_2$	10 : 100	0.15	0.53	0.03
$Ba(SCN)_2$	10 : 100	0.20	0.35	0.02
$Al_2(SCN)_6$	10 : 100	2.02	4.50	0.02
Thiocarbamide	10 : 100	0.83	1.87	0.79
Allyl thiocarbamide	1 : 100	0.40	0.08	0.008
	5 : 100	1.90	0.35	0.05
	10 : 100	3.90	0.72	0.09

The author discusses the bearing of the above results on the practice of photography.—Monatsh. f. Chem., 1894, 249.

Colloidal Silver.—E. A. Schneider.—The organosol Ag (EtOH), when treated with organic solvents, either remains in solution or coagulation takes place, and the production or absence of coagulation shows the existence or otherwise of an organosol with the organic solvent employed. No coagulation is observed with propylic, isobutylic, tertiary butylic, or ethylic alcohol, ethylene, glycol, glycerol, or phenol, Coagulation takes place after a few hours with trimethylamide and pyridine. Coagulation takes place at once with isopropylic, normal and secondary butylic alcohols, trimethylcarbinol, heptylic, cetylic or allylic alcohol, erythrol, octane, amylene, formaldehyde, œnanthaldehyde, acetone, ether, acetic acid, benzene, benzylic alcohol, metacresol, triethylamine, dimethylamine, diethylamine and quinoline. The solutions in which coagulation did not take place were observed for some months. With phenol, coagulation commenced after 14 days and gradually increased; and after one month coagulation was observed in the case of propylic and tertiary butylic alcohols. After two months, coagulation had taken place in all the solutions,

The organosol Ag(EtOH) was coagulated by ether, the precipitate washed with absolute ether and dried over sulphuric acid in a vacuum. It has a greenish metallic lustre, loses 45 per cent. in weight when heated, and when allowed to remain in a damp atmosphere increases in weight to the extent of 15.82 per cent. The dry colloid is entirely soluble in water.—Zeit. f. anorg. Chem., 1894, 339.

SILICON.

Preparation of Amorphous Silicon.—Amorphous silicon is prepared by Vigouroux by the reaction of magnesium with silica, thus:

$$SiO_2 + 2Mg = Si + 2MgO.$$

The silica (180 Gm.) and magnesium (144 Gm.) are mixed with magnesium oxide (81 Gm.), and heated in a furnace previously heated to a red heat. The reaction occurs in two or three minutes, raising the temperature to 540°, and a mass is obtained which, after drying, yields a brownish, homogeneous powder, containing from 99.09 to 99.60 per cent. of silicon when pure materials are employed.—Comp. rend., cxx., 94.

SODIUM.

Preparing Pure Sodium Carbonate.—Pure Na_2CO_3 for the preparation of standard carbonate for volumetric work may be obtained by dissolving as much bicarbonate of sodium as is possible in 250 Cc. of water at 80° C., freeing from insoluble impurities by filtration. On cooling down to a temperature of from 10° to 15° in a stream of water, a double salt, which has the composition of $Na_2CO_3 + NaHCO_3 + 2H_2O$, crystallizes out. Most of the soluble impurities remain in the mother liquor, which is sucked off, and the salt is further purified by repeated washing with small quantities of cold water. When heated in a platinum basin at a temperature just below perceptible redness, the residue is, according to Reinitzer, perfectly pure Na_2CO_3.—Brit. and Col. Drug., 1894, 587.

Vanadium in Commercial Caustic Soda.—H. L. Robinson.—A solution of caustic soda became deep purple in color when saturated with washed hydrogen sulphide, but on exposure to light with access of air, the color slowly faded, the liquid becoming yellowish, and a brown precipitate being formed; this was found to be due to the presence of vanadium, but this element apparently is not present as a vanadate.—Chem. News., 1894, 199.

Borax.—L. F. Kebler (Amer. Jour. Pharm., 1894, 428) finds that not only the bicarbonate of sodium (when contained in a mixture of borax and glycerin) interacts, but the normal carbonate likewise interacts, only less energetically. The acid reaction results not only with the polyhydric alcohol glycerin, but also with many other polyhydric alcohols, as manitol, erythrol, levulose, dextrose, glucose, *a*-galactose and *b*-galactose. Un-

doubtedly many other polyhydric alcohols, as sucrose, raffinose, lactose, dulcitol, quercite, etc., would produce the same results if subjected to the proper conditions.

It is reported that borax is even decomposed by water, for Rose has shown that strong solutions of this salt give precipitates of silver borate, while dilute solutions precipitate argentic oxide, like an alkali.

The acidity is unquestionably due to the transformation of the borax into sodium metaborate and boric anhydride, the latter uniting with water to form boric acid. As significant evidence substantiating the above statement, may be noted that no acid reaction results in the absence of water, for on using anhydrous borax, anhydrous glycerin, and elevating the temperature so as to expel the water formed during the reaction, no acid reaction results.

Volatility of Borax.—S. Waldbott.—From the author's experiments it is conclusively shown that borax glass is decidedly volatile at a white heat, particularly when heated in open crucibles. Even basic borates are sensibly volatilized, which fact must not be lost from view in the analysis of borates by Rose's and Schaffgotsch's processes.—Jour. Amer. Chem. Soc., 1894, 410.

Sodium Borosalicylate.—P. Adam.—It is well known that the solubility of salicylic acid in water is greatly increased by the addition of borax. On evaporating an aqueous solution containing sodium salicylate and boric acid in molecular proportions, a syrupy liquid is obtained which slowly deposits sodium borosalicylate, $C_7H_4O_4BNa$, as a white amorphous powder. It is soluble in four parts of cold water, and in methylic, ethylic, and amylic alcohols, ethylic acetate, etc. Solutions of the salt do not give the reactions of boric acid; its alcoholic solution does not burn with the green flame characteristic to this acid.

Borosalicylic acid does not seem to exist in the free state; on acidifying the solution of the sodium salt, boric and salicylic acids are deposited. —Bull. Soc. Chim., 1894, 204.

Analysis of Commercial Sodium Nitrite.—Massan.—Five Gm. of the nitrite are dissolved in 500 Cc. of water; 50 Cc. of this solution is transferred to a flask (1½ litres capacity), diluted to 1 litre, and this titrated with a standard solution of potassium permanganate (10 Gm. per litre) in the following manner: A few drops of a 10 per cent. sulphuric acid is dropped into the solution, the flask is shaken, and some potassium permanganate is immediately added; this alternate of acid and permanganate is continued until the pink color becomes permanent, when the flask is at once heated over a gas flame until the color fades; potassium permanganate and acid are then immediately added, and the flask heated anew. This cycle of operations is continued as long as the permanganate is decolorized by the solution, the final temperature of which will approximate the boiling point.—Jour. Chim., 1894, 41.

Sodium Nitride.—L. Zehnder has observed that when sodium is introduced electrolytically into glass tubes such as are used for illustrating Hertz' experiments, a portion of the deposit is reddish-brown in color, and in appearance closely resembles metallic copper. This is found to be due to the combination of nitrogen with part of the sodium, and probable formation of the compound NNa_3.—Ann. Phys. Chem. 1894, 56.

Analysis of Sodium Peroxide.—L. Archbutt.—After trying the permanganate process with but indifferent success, the author succeeded very well by using cobalt nitrate. The sample is weighed into a small tube which is placed in a flask attached to a Lunge's nitrometer. In the flask is put 5 Cc. of water and a drop of cobalt solution; the mercury is then leveled, and on bringing the peroxide into contact with the reagent, the available oxygen is quantitatively liberated and its volume ascertained as usual.—Analyst, 1895, 3.

Sodium Peroxide.—T. Poleck.—The chemical behavior of sodium peroxide is quite analogous to, but much more energetic than, that of the peroxide of hydrogen or barium. Tin, antimony, and arsenic may also be separated by precipitating as sulphides with ammonium sulphide, evaporating off the excess of the latter, and oxidizing the dissolved sulphides with sodium peroxide; the oxides of the metals may then be separated in the ordinary way. The oxidized product may be at once tested for arsenic by Marsh's method, which would be impossible if nitric acid had been the oxidizing agent employed.—Ber. d. Chem. Ges. 1894, 1051.

Behavior of Sodium Peroxide Towards Alcohol.—J. Tafel.—A compound of the composition NaO_2H, which the author names sodylhydroxide, is obtained when sodium peroxide is shaken with well-cooled absolute alcohol. It remains undissolved as a yellowish sandy mass, whilst the alcoholic solution contains only traces of active oxygen. It dissolves in water with a much smaller development of heat than sodium peroxide, and, when heated in a tube, explodes with evolution of oxygen. It also slowly gives off oxygen at 5°, absorbs water from the air, and is converted by dry carbonic anhydride into sodium carbonate, water and oxygen. It dissolves in ice-cold water without evolution of gas, but a slight rise of temperature determines decomposition; when mixed with dilute alcohol, it yields crystals of the compound $Na_2O_2 8H_2O$; with alcoholic hydrogen chloride at —5°, it yields a product which contains 1 mol. NaCl and 1 mol. NaO_2H; at higher temperatures the products of the action are sodium chloride and hydrogen peroxide. It dissolves in cold alcoholic acetic acid, and forms a compound of the formula $NaC_2H_3O_2$, $NaOC_2H_3O_2H_2O$. With benzoic chloride at ordinary temperatures, it yields sodium chloride and benzoic peroxide (m. p. 105°).—Ber. d. Chem. Ges., 1894, 2297.

Electrotytic Production of Soda and Chlorine.—The works of the Aluminum Company employ the following process: Its essential feature is

the employment of a moving body of mercury, which completely separates the products of the electrolysis, and by its movement takes the place of a diaphragm, the amalgam formed by the electric action being decomposed electrically as rapidly as it is so formed. The use of mercury as a cathode is a very old idea, but one which has not hitherto met with any success, the great difficulty standing in the way being the enormous quantity of mercury required in carrying on such a process, and the great quantities to be handled in order to obtain relatively small quantities of caustic soda. Castner has effectually solved this difficulty, the cells employed, each divided into three compartments, being capable of being continuously rocked or tilted, so as to give to the contained mercury a flowing motion from side to side. Two outside compartments contain the alkaline chloride solution and the carbon anodes, while the middle compartment contains an iron cathode and the caustic solution. The solution of salt or chloride is continuously circulating through the outside compartments, wherein it is being electrolyzed, and then returns to saturators, where it is recharged with salt. The electric current, traversing the salt solution, liberates chlorine, and also forms sodium amalgam. The process is, of course, continuous, and it has demonstrated, among other results, that the electrical efficiency is as much as 88.9 per cent.; that no hypochlorites are produced, their production being a defect in other kindred processes; that the solution forming and carrying the electrolyte is in continuous use; that the electro-motive force required for each cell is low, due to the non-accumulation of sodium in the mercury, and particularly to the fact that the electrodes are brought almost into contact.—Brit. and Col. Drug., 1894, 299.

Titration of Carbonated and Caustic Alkaleis.—Aslanoglou finds (Chem. News, lxx., 166) that titration of total alkalinity with methyl orange indicator, and in another portion, titration to neutrality with phenolphthalein indicator (bicarbonate) is condemned as untrustworthy. Wilson (Chem. News, 1895, 209) finds this conclusion unwarranted if proper precautions are taken.

STRONTIUM.

Solubility of Strontium Bromide.—Fonzes-Diacon finds that the solubility of anhydrous strontium bromide in ethylic alcohol is practically constant between 0° and 40°, 100 Gm. of absolute alcohol dissolving about 64.5 Gm. of the salt, and forming a solution, of which the density is 1,210 at 0°. Saturated solutions allowed to stand in stoppered bottles deposited, in the course of several months, fine crystals belonging to the orthorhombic system. On analysis these were found to contain $\frac{4688}{1000}$ of alcohol, and the composition is probably represented by the formula $2Br_2Sr,5C_2H_6O$.—Jour. Pharm. Chim., 1895, 59.

SULPHUR.

Black Sulphur.—L. F. Kebler (Amer. Jour. Pharm., 1895, 242) has looked into the subject of "black sulphur." He states that that commonly sold is sulphide of antimony and sulphur flowers. Another article examined proved to be metallic iron, crude sulphur and earthy matters; another calcium carbonate and coal dust. Sulphur vivum, the residue from the sublimation of sulphur, reduced to powder, is also known under this name. "White sulphur" is precipitated sulphur made from solution of polysulphide of calcium by precipitation with sulphuric acid (instead of the usual hydrochloric acid) whereby calcium sulphate was precipitated along with the sulphur.

Sulphur Præcipitatum.—E. Fittinger says that the G. P. test requiring that 1 part of precipitated sulphur should dissolve in 5 parts of CS_2, is exceedingly simple and trustworthy.—Pharm. Post, 1894, 297.

Detection of Traces of Metallic Sulphides in Precipitated Sulphur.—R. Fresenius.—It is not unfrequent in qualitative analysis to obtain a considerable precipitate of sulphur, in which traces of the yellow sulphides of cadmium, arsenic, or tin, may be present without being visible. By half filling a test-tube with the turbid mixture, adding a layer of benzene or light petroleum 2 Cm. high, shaking violently for a minute, the sulphur passes entirely into the organic solvent, whilst the sulphides are left as films, partly between the two layers of liquid, but mainly on the walls of the tube above the liquid. Should metallic sulphides be found to be present, it is best to treat a larger portion of the liquid in a similar way, and then filter the liquid through a wetted filter. After allowing the aqueous solution to drain away completely, the sulphur solution can be poured from the filter, to which the sulphides for the most part adhere firmly, and the filter can then be washed with water. Only in such exceptional cases as the decomposition of hydrogen sulphide by sulphurous or nitrous acids, is the precipitated sulphur insoluble in benzene or petroleum.—Zeit. f. Anal. Chem., 1895, 573.

Variations in the Viscosity of Fused Sulphur.—F. Brumhes and J. Dussy.—The viscosity of fused sulphur at first decreases, like that of other liquids, as the temperature rises. The rate of transpiration increases from the melting point to a point between 156–157°; it then diminishes very rapidly, and at 162° it has become so viscous that it cannot be forced through a tube 1 Mm. in diameter, even by the pressure of a column of mercury 700 Mm. high. At higher temperatures a change in the opposite direction takes place, and may be regarded as a second fusion. At 156° the rate of transpiration of the sulphur is 1.796 that at 115.5°. The rate of transpiration at 115.5° is 0.0518 and at 156° 0.093 that of water at 25.5°.—Compt. rend., 1894, 1045.

TIN.

Iodides of Tin.—Chas. Bullock (Amer. Jour. Pharm., 1895, 83). *Stannous iodide* crystallizes in yellowish-red needles. It is slightly soluble in water and soon decomposes, with formation of hydriodic acid and oxide of tin. In warm solution of the chlorides and iodides of the alkali metals it dissolves freely. When heated to near redness in the absence of air it liquefies, but does not sublime; on cooling it solidifies into a crystalline mass, which affords a yellow-red powder. When heated in an open vessel it is resolved into iodine, which sublimes, and oxide of tin, which is left.

Stannic Iodide is obtained when tin and iodine are brought together in a dry state. To prepare it, tin in a granular condition is placed in a flask, and twice its weight of iodine gradually and carefully introduced. To prevent violent reaction it is recommended to moisten the tin with carbon disulphide before introducing the iodine. But this is not necessary if proper caution be used. The contents of the flask liquefy by the heat generated. When the reaction is over the flask is heated and shaken to insure complete combination. When cold the iodide solidifies to a mass having a chocolate color and with crystalline structure. The mass was placed in a porcelain dish, covered with a funnel having a long neck with a small flask on the top. It melts at about 150° C., and the stannic iodide sublimes at about 180° C., collecting in the funnel in yellow-red octahedral needles. The stannous iodide which forms part of the mass does not sublime when air is excluded even at red heat. By this method the two metals are separated.

Stannic iodide has a specific gravity of 4.690. It is soluble in carbon disulphide, absolute alcohol, methyl alcohol, ether, chloroform, benzol and oil of turpentine. It is quite sparingly soluble in water, and the aqueous solution soon decomposes into hydriodic acid and stannic oxide.

It is not clearly stated which of the two iodides is wanted for medicinal purposes; and, as their therapeutic effects may vary very much, more information is wanted before they can be dispensed with safety.

A Sulphide of Tin Soluble in Ammonium Carbonate.—In the course of some experiments, having for their object the preparation of tin absolutely free from arsenic, F. W. Schmidt has obtained an oxysulphide of tin, which is readily soluble in ammonium sulphide. The substance can be prepared as follows: A solution of stannous chloride is oxidized by warming, adding nitric acid; it is then evaporated to drive off at any rate part of the excess of acid; is diluted with water, and then treated with hydrogen sulphide. The precipitated sulphide is washed, dissolved in concentrated hydrochloric acid, the solution diluted, filtered and again treated with hydrogen sulphide, which then yields sulphide of tin free from arsenic sulphide. The precipitate is carefully washed, and is then treated with a solution of ammonia; after standing for several days at the ordinary tem-

perature, it is practically all dissolved. After filtration the ammoniacal solution is diluted and acidified with sulphuric acid, when an almost white precipitate is thrown down. This, when freshly deposited, dissolves completely in ammonium carbonate solution. On standing, it becomes less soluble. Analysis showed the dry substance to be an oxysulphide of the formula Sn_2S_3O. The sulphide becomes yellow in color on standing exposed to the air, and at the same time less and less soluble in ammonium carbonate. Eventually it becomes insoluble; but if the substance be redissolved in ammonia and again precipitated by addition of acid, the white voluminous sulphide is again obtained, completely soluble in carbonate solution. The change which takes place on exposure to the air seems to be a loss of combined water and the parallel conversion of a voluminous deposit into one that is, relatively, very compact.

The bearing of this investigation upon the exact separation of the sulphides of tin and arsenic, with the aid of ammonium carbonate solution, is evident.—Pharm. Era, 1895, 334.

ZINC.

Assay of Zinc Salts.—Barthe (Pharm. Jour. and Trans., liv., 642) describes a method of determining the purity of zinc salts, either by determining the excess of acid or the actual amount of zinc. The process depends on the use of standard alkali and of the two indicators—tincture of hollyhock (Rose tremiere) and phenolphthalein. The analysis is conducted in two stages, and is as follows: The salt under examination, the sulphate, nitrate, etc., is dissolved in water, and the excess of acid, if any, determined by titration with decinormal potash, using tincture of hollyhock as an indicator. The reaction is complete when the color changes to green, but it is necessary to work with dilute solutions to obtain accurate results. With another portion of the salt a solution is made and alkali added till the red color of phenol phthalein is permanent. The amount of alkali required to react with zinc is now obtained by subtracting the volume of alkali used in the first operation from that of the second, and then calculating for the formation of the salt $(ZnO)_4ZnSO_4$, or every cubic centimeter of $\frac{N}{10}$ potash used will represent $\frac{0.00325 \times 5}{4}$ gram of pure zinc.

To Test Zinc Oxide.—Th. Salzer (Pharm. Post., 1894, 406,) recommends dissolving 1 part of the drug in 6 parts of dilute acetic acid, and adding 30 parts of water and then 18 parts of ammonia-water. The clear fluid thus obtained must not be rendered turbid by ammonium oxalate or by sodium phosphate (lime or magnesia).

Presence of Ammonia in Zinc Powder.—F. Robiman and G. Rollin.—Zinc powder contains ammonia, partly in a form soluble in hot water, partly also in combination, from which it is set free by boiling with soda. It can be entirely freed from ammonia by boiling and washing with dilute

sulphuric acid (1–100), but, after drying in purified air, ammonia can again be detected in it.—Zeit. f. anal. Chem.; from Moniteur Scientifique [4], 7, 138.

Colloidal Zinc Sulphide.—P. Dounini.—It is well known that precipitated zinc sulphide may be washed with ammonium chloride solution without any turbidity of the supernatant liquid resulting; washing with pure water, however, causes an opalescence which cannot be removed by filtration. The author shows that this is due to part of the zinc sulphide assuming a colloidal form in the presence of pure water, whilst the addition of an ammonium salt to the solution renders the sulphide again insoluble.—Gazzetta, 1894, 219; Jour. Chem. Soc., 1894, 318.

Valuation of Zinc Dust.—O. Bach.—1 Gm. of the sample is placed in a flask containing a little water and a small cylinder filled with a sufficiency of sulphuric acid; the flask is fitted with a doubly perforated india-rubber cork, through which pass two glass tubes bent at right angles, one of which reaches nearly to the bottom of the flask, and is in connection with a carbonic anhydride apparatus, whilst the other is connected with a delivery tube leading to a burette filled with, and standing over, 10 per cent. aqueous soda. Carbonic anhydride is first passed until all the air has been expelled, and, after connecting the delivery tube with the burette, the sulphuric acid is made to run into the flask. After the action has ceased, more carbonic anhydride is passed until the volume of gas in the burette no longer increases; the burette is transferred to a large cylinder filled with water, and, after leveling, the volume of hydrogen is read off and corrected for temperature and pressure. The calculation may be avoided by using Dietrich's tables.—Zeit. f. angew. Chem., 1894, 291.

Stearate of Zinc.—F. Edel prepares this and other stearates by the following process which in principle is the double decomposition between stearate of potassium and the salt of which the stearate is to be made: (1) *Stearate of potassium*, caustic potash, 143 grains; stearic acid, 897 grains; alcohol, 3 ozs; distilled water, ½ gal. (2) Then dissolve 289 grains of zinc acetate in 8 fluidounces of water, warm to about 160° F., and then add slowly, stirring constantly, to 64 fluidounces of a solution of potassium stearate prepared as described above. Then add 64 fluid ounces of water, stir thoroughly, let stand for a few minutes, collect the precipitated zinc stearate on a muslin strainer, free thoroughly from potassium acetate by washing with water, and lastly allow to dry.—Drug. Circ., 1894, 267.

CHEMISTRY OF THE CARBON COMPOUNDS.

Organic Acids.

Decomposition of Fatty Acids by Oxidation at Ordinary Temperatures in the Absence of Ferments.—O. Frank.—The salts of the higher fatty acids, such as oleic and stearic acids, are decomposed by the oxygen of the air at ordinary temperatures, especially when the oxidized acid, which is formed, is removed from the sphere of action. This decomposition is especially important in the case of ethereal extracts of animal tissues, such as occur in the separation of cholesterol from fat by Hoppe-Seyler's method, where the fat is hydrolyzed and extracted with ether. This method gives results which are too high. By employing basic salts, the oxidation of the fatty acid can be considerably lessened.—Chem. Centr., 1894, 1143; Arch. Physiol., 1894, 51.

New Process for Acetic and Oxalic Acids.—Both of these acids are obtained from wood; the first by destructive distillation, and the second by impregnating the wood with alkalies and then heating at a low temperature. An English patent has recently been taken out for obtaining the two acids in one operation. The wood or moss is first impregnated with caustic alkalies, then steam, mixed with air, is blown over it. Acetic acid is thus formed, at low temperatures, while at 300° C. or above, oxalic acid is formed. The relative proportions of each may be regulated by the temperature and the proportion of air, while paper-pulp remains as a by product.—West. Drug., 1894, 238.

Isocampholic Acid.—Guerbet.—The residue from the preparation of campholic acid, by the author's method of heating camphor, sodiocamphor and sodioborneol in sealed tubes, contains another acid, isocampholic acid, which has the same composition. The campholic acid is liberated by passing a current of carbonic anhydride through the faintly alkaline liquid, and the isocampholic acid is precipitated on adding hydrochloric acid. In order to purify it, it is dissolved in ether, dried over calcium chloride, the ether distilled off, and the residue mixed with its own weight of absolute alcohol, and saturated with hydrogen chloride at 0°. Under these conditions, isocampholic acid yields an alkali salt, whilst campholic acid does not.—Compt. rend., 1894, 278.

Isocaproic Acid and the Solubilities of its Calcium, Barium and Silver Salts.—J. König.—As contradictory statements have been published regarding the barium and calcium salts of this acid, the author has considered it desirable to synthetize them from pure materials. The method adopted was to prepare ethylic isobutylmalonate, $C_{11}H_{20}O_4$, which boils at

225–226°, by gradually adding sodium ethoxide in alcoholic solution to a mixture of isobutylic iodide and ethylic malonate. From this the free acid $C_7H_{12}O_4$, which forms drusy masses of crystals, and melts at 107°, was obtained; and this on heating in a reflux apparatus, was resolved into carbonic anhydride, and isobutylacetic acid.—Monatsh. f. Chem., 1894, 17.

Carminic Acid.—E. Schunck and L. Marchlewski.—Pure carminic acid is prepared by treating cochineal extract with lead acetate, decomposing the lead salt with sulphuric acid in presence of alcohol, and evaporating to dryness at the lowest possible temperature; the residue agrees in properties with the "carminic acid" described by others, and is further purified by dissolving it in cold absolute alcohol and precipitating with ether, benzine, or chloroform. It then crystallizes from alcohol, at the ordinary temperature, in small red prisms. Aqueous solutions of carminic acid, when evaporated, give an amorphous substance, but no crystals. Crystallized carminic acid, $C_{11}H_{12}O_6$ or $C_{11}H_8O_4 + 2H_2O$, differs little in properties from the amorphous preparations; it darkens at 130°, and blackens without melting at 205°. In alcoholic solution, it shows three ill defined absorption bands, one in the green and two in the blue; in alkaline solution, they appear in the yellow and green. The barium and calcium salts are brown, changing to violet with excess of base; the lead and aluminum salts are also violet, and the stannous salt scarlet. Aqueous carminic acid solutions are immediately decolorized by animal charcoal, the latter increasing greatly in volume and becoming gelatinous. This peculiar compound is not changed by alcohol, but is decomposed into its constituents by alkalies. The anilide, $C_{17}H_{15}O_2N + 3H_2O$, is deposited in ruby crystals, darkens at 130°, melts and decomposes at 189–190°, and is hydrolyzed by alkalies. It is impossible, at present, to decide in what manner the water is combined in the molecule.—Ber. d. Chem. Ges., 1894, 2979.

Carnic Acid.—Siegfried.—Carnic acid ("Fleischsäure") $C_{10}H_{15}N_3O_5$, is contained in muscle as a compound of phosphoric acid, phosphorcarnic acid, and forms readily soluble salts of calcium and barium, which decompose when their solutions are boiled, the corresponding phosphate being deposited. It forms a ferric compound, carniferrin, which is soluble in alkalies, and only gives the reactions for iron after being in contact with the reagents for some time. Carnic acid is monobasic, and yields crystalline salts of zinc, copper, and barium. The silver salt, $C_{10}H_{13}N_3O_5Ag_2 + 2H_2O$, is sparingly soluble; the second atom of silver probably replaces the hydrogen atom of an imido-group. Carnic acid also unites with 1 mol. of hydrogen chloride; the substance formed reacts with silver nitrate only on heating. From its properties, carnic acid appears to be identical with antipeptone, and has been observed among the products of tryptic digestion.—Ber. d. Chem. Ges., 1894, 2762.

Phosphorcarnic acid.—A. Siegfried has previously shown that the mus-

cles contain a compound termed phosphorcarnic acid, which is easily separated by means of its iron compound, "carniferrin." By the action of baryta water, the acid is resolved into phosphoric acid and carnic acid, $C_{10}H_{15}N_3O_5$, which is identical with anti-peptone. The alcoholic mother liquor obtained after the decomposition of the carnic acid contains succinic acid and sarcolactic acid; the former gave a soluble barium salt probably derived from the labile modification of the acid. By the action of sodium carbonate on carniferrin, and treatment of the filtrate with baryta water, phosphoric acid, carnic acid, and a sugar are formed; the latter readily reduces Fehling's solution, and yields an osozone, but has not yet been identified. It is very probable that sarcolactic acid is formed by the hydrolysis of phosphorcarnic acid, and attempts will be made to prove this. The term nucleon is suggested for compounds, such as phosphorcarnic acid, which are allied to the nucleus, but contain peptone instead of albumin. Following Kossel, it is necessary to distinguish between true nucleons and paranucleons; phosphorcarnic acid belongs to the latter class and may be termed muscle nucleone. Experiments on dogs have shown that phosphorcarnic acid is absorbed during muscular activity; in one instance three times as much was present in inactive muscles as in fatigued ones. This explains the appearance of phosphoric acid in the muscles as the result of their activity. As carnic acid has not hitherto been detected in the muscles, it is either absorbed during muscular growth or it contributes by its oxidation to muscular energy. The formation of ammonium thiosulphate from ammonium sulphide and carnic acid, which has been previously suggested as a test for the latter, only applies when colorless, recently prepared, ammonium sulphide is employed, as the yellow compound when evaporated alone yields ammonium thiosulphate.—Ber. d. Chem. Ges., 1895, 515.

Chrysophanic Acid.—O. Hesse.—The substance sold under this name is chrysophanic acid. Under this title Hesse recognizes the acid obtained from rhubarb. He gives the following mode of preparation: 1 part of powdered rhubarb is well shaken with 5 parts of ether; after distilling off the solvent, the residue is washed with a little alcohol, and then dissolved in chloroform and filtered; this chloroform solution is evaporated and the residue washed with a solution of potassium carbonate; the undissolved portion is then crystallized from hot alcohol. Chrysophanic acid forms scaly-like crystals, which melt at 178° C., and dissolve in sulphuric acid with a deep red color.—Ann. der Chem., 1895, 284.

Decomposition of Tartaric and Citric Acids by Sunlight.—W. Seekamp.—A 5-per cent. solution of tartaric acid, in which 1 per cent. of uranic oxide was dissolved, was exposed to sunlight. Gas was soon evolved, and the liquid became green, due to the reduction of the uranic oxide. After a month the liquid was examined, and found to contain aldehyde, which was removed by distillation. The residual liquid, which had an acid re-

action, was neutralized with lead hydroxide, and from the resulting precipitate, on decomposition with hydrogen sulphide, tartaric, malic, and succinic acids were obtained, whilst the filtrate contained a cupric reducing substance, together with, perhaps, propionic acid. Citric acid behaved in a similar manner.—Ann. der Chem., 1894, 373.

Citric Acid from Cane Sugar.—E. Maumenè states that the addition of potassium permanganate solution to solution of sugar resulted in the formation of manganese sesquioxide or protoxide and hexenic acid, $C_{12}H_{12}O_{14}$. T. L. Phipson now claims to have prepared citric acid from cane sugar by the action of permanganic acid. The solution of sugar was acidulated with a few drops of sulphuric acid, and a strong solution of potassium permanganate added. In a short time the solution became transparent and colorless. Neutralized with ammonia, and calcium chloride added, no precipitate was formed until the liquid was boiled, and the precipitate then obtained was soluble in acetic acid. On decomposing the calcium precipitate with sulphuric acid and evaporating the solution, small but well formed crystals appear, which correspond in shape and properties to those of pure citric acid. Excess of permanganate resulted in the formation of oxalic acid in addition.—Chem. News, 1895, 296.

Citric Acid and its Alkali Salts.—T. Salzer.—Finely powdered citric acid becomes anhydrous when slowly heated at 55°, and in this condition melts at 160°. Buchner and Witter have shown that anhydrous citric acid may be regenerated from its lead salt by decomposing it with hydrogen sulphide, whilst the corresponding lead salt obtained from the hydrated acid gives rise to the modification from which it is derived. On examining the sodium and potassium salts derived from the anhydrous acid, however, the author finds that they are identical with those of the hydrated form. Monosodium citrate prepared from the anhydrous acid crystallizes with $1H_2O$, and dissolves in about 4½ parts of water at 18° and 1¼ parts at 100°, being slightly more soluble than the anhydrous salt. The disodium citrate described by Heldt is monohydrated, but the author's investigation points to the existence of a salt crystallizing with $2\frac{1}{2}H_2O$, and soluble in about 3 parts of cold water; the greater part of the water of crystallization is driven off at 100°. Anhydrous monopotassium citrate can be obtained in measurable crystals belonging to the triclinic system.—Arch. der Pharm., 1894, 514.

Diamido-Fatty Acids.—Klebs Zeitschr. f. Phys. Chem., 1894; Brit. and Col. Drug., 1894, 487) states there are four known representatives of the class, viz, diamido-acetic, diamido-propionic, diamido-valerianic, and diamido-caproic acids. Popularly the two latter ones are known as ornithin and lysin, respectively. They are all crystalline bodies, soluble in water. The basic properties of the diamine group are lessened, but not destroyed, by the presence of the COOH group in the acid molecule. The

acid character of the compounds is preserved and well shown by the formation of compounds of copper and mercury. The nitrate of diamidoproprionic acid has been prepared; it has the formula $C_3H_4(NH_2)_2O_2HNO_3$.

Hydrophosphocyanic Acid.—W. B. Shober and F. W. Spanutius.—Sodium free from oxide and hydroxide was introduced into a hard glass tube, and melted in a current of pure, dry hydrogen. When the sodium was fused the hydrogen current was replaced by a slow current of pure dry phosphine, the sodium being kept strongly heated. The sodium was gradually converted into a black mass, which was either PH_2Na, $PHNa_2$, or PNa_3, or a mixture of these. Without allowing the apparatus to cool the phosphine current was then replaced by pure, dry carbonic oxide, and this passed for an hour. The mass so produced was spontaneously inflammable in air, and was decomposed by water, with an evolution of phosphine. Treated with alcohol, a part dissolved, leaving a black residue, but the solution gradually decomposed. It was found impossible to isolate any of the products. When treated with alkalies, the product yields phosphine and formic acid, from which the authors concluded that it contained hydrophosphocyanic acid, HCP, the analogue of hydrocyanic acid.—Amer. Chem. Jour., 1894, 229.

Daturic Acid.—E. Gerard adduces evidence to prove that his former communication on the existence of this fatty acid, which has been doubted in certain quarters, was fully justified by the facts of the case. He points out that Noerdlinger, and Wanklyn, and Johnstone, working by different methods, have isolated an acid of the same formula, $C_{17}H_{34}O_2$, as that ascribed to daturic acid, which occupies a position between palmitic and stearic acids, and forms salts with magnesium, lead, copper, barium, and zinc, all of which can be crystallized from alcohol. Neutral sodium daturate decomposes in the presence of water, sodium bidaturate being formed. The acid salt washed with ether yields the neutral salt and free acid, whilst similar results are obtained with the potassium compounds.—Compt. rend., cxx., 565.

Filicic Acid.—G. Daccomo.—Copper filicate is obtained as a green crystalline powder; it has the composition $C_{28}H_{30}O_{10}Cu$, and not that attributed to it by Grabowski. The ammonium salt, $C_{14}H_{15}O_5NH_4$ is a white, amorphous powder, having no definite melting point. On oxidation with hydrogen peroxide, filicic acid yields an acid $C_{14}H_{16}O_6$; it is a red, amorphous powder, and does not reduce ammoniacal silver nitrate solution.

The potassium salt, $C_{14}H_{15}O_5K$, is a reddish crystalline powder and is very soluble in water or alcohol. On oxidizing filicic acid with potassium permanganate, nitric acid, bromine, or iodine, butyric acid is obtained together with a bibasic acid, $C_5H_8O_4$, which is probably dimethylmalonic acid.—Gazzetta, 1894, 511; Jour. Chem. Soc., 1895, 68.

Determination of Formic Acid.—The well-known property of formic

acid to reduce potassium permanganate is utilized by A. Lieben (Chem. News, lxx., 276) to volumetrically determine this acid. He says that it is practicable to obtain a complete oxidation of formic acid in presence of sodium carbonate so as to admit of a volumetric determination. It is immaterial whether the process is conducted at ordinary temperatures or in heat, and the quantity of the excess of sodium carbonate added is also unimportant. The oxidation takes place according to the equation: $3KCHO_2 + 2KMnO_4 = 2MnO_2 + 2K_2CO_3 + KHCO_3 + H_2O$. The final point of the titration is not easily recognized, since the red color produced towards the end of the reaction disappears but slowly. It is, therefore, necessary to wait for some time in order to be convinced of the permanence of the red coloration. The author, when titrating in the cold, allows the liquid to stand covered over night, in order to become satisfied of the completion of the process by the permanence of the red color. If the titration is effected in the cold, a much shorter time is sufficient. The analyses quoted are satisfactory. The method is applicable for the determination of formic acid in a free condition or in its salts. It is, of course, useless in the presence of other constituents which reduce permanganate. The author has besides tested the method recommended by Scala. He finds that correct results can be obtained only if the excess of mercuric chloride added to the neutralized solution is very considerable. At least 50 times the weight of the formic acid will have to be present, or four times the quantity theoretically required. It is also to be recommended not merely to heat in the water-bath for two hours, as Scala proposes, but six or eight hours. It is necessary, after filtration, to heat the filtrate for some time in the water-bath in order to be satisfied of the entire completion of the reaction. A slight turbidity may be disregarded, as 1 centigramme of $HgCl_2$ corresponds only to about 1 milligramme of formic acid.—(See also under Assay.)

Derivatives of Gallic Acid.—C. Boettinger.—The action of a mixture of glycerol and hydrogen potassium sulphate on gallic acid is not analogous to its action on tannin, as, instead of condensation and hydration, reduction and oxidation take place; a similar action occurs in the reduction of dialuric acid to acid ammonium hydrurilate by this mixture. The products are separated by means of alcohol; the relative yield varying accordingly as the gallic acid is hydrated or anhydrous. The reduction product, hydrogalalic acid, $C_{14}H_{10}O_8 + H_2O$, has the same formula as octohydrorufigallic acid, and is peach colored. It is insoluble in water, but soluble in alcohol, methylic alcohol, aniline, and ammonia; the color of the ammoniacal solution is at first blue, and soon changes through intense violet to brown. Hydrogalalic acid is almost entirely destroyed by fusion with potash, and yields only a small quantity of a very oxidisable oil, when distilled with zinc dust; this oil does not possess the characteristic odor o the corresponding products from hydrotannic and hydroquercitannic

acids. The acid dissolves freely in fuming sulphuric acid. The acetyl derivative, $C_{14}H_{14}Ac_2O_8$, crystallizes in yellowish-grey plates. The oxidation product, $C_{12}H_{14}O_9 + 2H_2O$, appears to be a derivative of pyrogallol; it is a dull, brownish-violet powder, and is insoluble in water and ammonia, although its color is changed to violet by the latter. It yields an acetyl derivative, $C_{12}H_{13}AcO_9$, a brownish-gray substance insoluble in water, alcohol, and cold dilute soda.—Arch. der Pharm., 1894, 545.

Transition from Propionic Acid to Lactic Acid.—F. Gand.—On operating on 500 Gm. of liquid containing 50 Gm. of propylic alcohol distributed in twenty tubes, and heating them with Fehling's liquid to 250° for 200 hours, he obtained about 4 Gm. of a first acid and 3.5 Gm. of a second, both answering approximately to the formula $C_3H_6O_3$. A cryoscopic experiment showed 88 to 89 as the molecular weight. The study of their chemical properties has made it possible to identify the first acid as the ethylidenolactic acid and the second as ordinary lactic acid.—Compt. rend., Vol. cxix., No. 22.

A Reagent for Oxalic Acid.—A solution of 1 part of ferrous phosphate in 8 parts of water, with an excess of phosphoric acid, produces (according to the Journ. de Pharm. d'Anv.) a bright yellow precipitate in even a very dilute solution of oxalic acid, a reaction which is produced by no other body. The precipitate does not appear in the presence of a mineral acid.—Amer. Drug. and Pharm. Rec., 1895, 339.

Constitution of Ricinoleic Acid and its Derivatives.—P. Walden.—According to the formulas proposed for ricinoleïc acid by Krafft,

$$CH_3.[CH_2]_5.CH(OH).CH:CH.[CH_2]_8.COOH$$

and Goldsobel,

$$CH_3.[CH_2]_5.CH(OH).CH_2.CH:CH.[CH_2]_7.COOH,$$

this substance contains an asymmetric carbon atom as well as an ethylenic linking. The author has studied the application of the stereochemical theory to this compound and its derivatives, and has also determined their behavior towards polarized light.—Ber. d. Chem. Ges., 1894, 3471.

Ricinoleic Acid, Ricinelaidic Acid, and Ricinostearolic Acid.—C. Mangold.—Ricinoleic acid distills under 50 Mm. pressure at 250°, leaving a dark viscid residue in the retort. The distillate which has the composition $C_{18}H_{32}O_2$ is a colorless oil at ordinary temperatures, but solidifies in a freezing mixture; it gives a barium salt which is insoluble in alcohol. Ricinelaïdic acid is obtained by treating castor oil with sodium hydroxide and pouring the mixture into warm dilute hydrochloric acid. The product is then washed with water and treated with dilute nitric acid and potassium nitrate. It crystallizes from light petroleum in white crystals, and melts at 57°; when distilled under 15–30 Mm. pressure, it boils at 240–

250°, but at the same time decomposes, being converted into a new acid of the composition $C_{18}H_{32}O_2$. This crystallizes in lustrous, white tablets, and melts at 53–54°. Ricinelaïdic acid, when reduced with red phosphorus and iodine, and then with zinc and hydrochloric acid, is converted into stearic acid.

Ricinostearolic acid, $C_{18}H_{32}O_3$, is obtained by brominating pure castor oil and boiling the product with alcoholic potash; it melts at 51°. The barium salt crystallizes from alcohol in beautiful silky leaflets. When the acid is treated with concentrated sulphuric acid, it is converted into hydroxystearoricinic acid. This separates in white crystals and melts at 78–80°.—Monatsh f. Chem., 1894, 307.

New Method of Preparing Salicylic Acid.—A process has been patented in which instead of adding an excess of potassa to the carbolic acid one molecule of the former is added to two of the latter in the presence of (infusorial earth). The mixture is then acted on direct by carbon dioxide at a temperature of 120 to 160°, the pure acid resulting, as the infusorial earth retains the impurities.—Chem. Zeit., 1894, No. 71, 1356.

Potassium and Aluminum Salicylate.—This double salt is produced when potassium acetate and aluminum salicylate are heated together. The compound is soluble in water; on cooling its filtered aqueous solution it separates from it in the form of crystals.—Pharm. Zeit.; Amer. Drug. and Pharm. Rec., 1895, 338.

Formation and Function of Tannins.—In a paper in Programm der Realschule vor dem Holstenthore in Hamburg, G. Mielke traces the formation of tannin in plants through phenols, phenol-alcohols, and aldehydes; they occur, in chemical combination with sugar, as glucosides, and play an important part in vegetable economy, since they are the indispensable materials for the production of liquifying substances. They are never formed out of albuminoids, and are not nutritive substances; they can take part in metabolism only when they revert to their previous stages by absorption of water. Resins and essential oils are probably the final results of the metamorphosis of tannins.—Pharm. Jour. Trans., 1894, 355.

Purity of Tannic Acid.—Vulpius finds that none of the commercial tannic acids react when tested for gallic acid with potassium-cyanide solution. Five per cent. solutions of the acid give after a few minutes a rose color with the reagent. The ether test of the German Pharmacopœia he does not think reliable, for tannic acid is slightly soluble in ether of sp. gr. 0.710, because that ether is not absolute. He finds that an ether containing 0.1 per cent. of water and 0.8 per cent. of ethyl alcohol dissolves 0.3 per cent. of tannic acid.—Chem. Drug., 1895, 159.

Oxidation of Tannin of the Cider Apple.—L. Lindet says it may be accepted as an established fact that the oxidation of the tannin of the apple is due to the action of a diastase enclosed in the tissue of the fruit,

and belonging to the type of the laccases. Further research is required to show whether this is directly due to oxidation, or if it splits up the tannin into molecules more easily oxidized.—Compt. rend., vol. cxx., No. 7.

Palmetto Extract.—Schutzer has obtained from palmetto 11½ to 12 per cent. of tannin, and claims that it has valuable tanning properties.—Chem. Zeit., 1895, 167.

To Distinguish Gallic and Tannic Acids.—F. Davis adds to the solution KOH and then a solution of barium chloride. With tannic acid a pink precipitate is obtained which gradually darkens, while tannic acid forms a blue precipitate.—Nat. Drug., 1894, 246.

Determination of Tannic Compounds.—A. Girard, in commenting on his method of using harmonic strings, now further says, to avoid errors it is sufficient to obtain strings carefully prepared in the ordinary manner, and complete their purification in the laboratory. These membranes do not require to have been twisted in the form of fiddle strings. If simply dried, and treated with sulphurous acid to ensure their preservation, will be fully sufficient for the determination of the tannic compound. The strings are then cut into threads of 0.15 metre in length and submitted in the cold to the action of crystallizable benzene. These washings are repeated until the benzene no longer takes anything up. They are then exposed in the cold to the open air, and when the benzene has evaporated there follow three or four washings with cold distilled water. When taken out of the water they are dried in cold air, moving them so that they may not cling together. They are then ready for use. All the causes of error are thus removed, and they may be safely used for the determination of the tannic compound according to the method described in 1882.—Compt. rend., cxx., 358; Chem. News, 1895, 195.

Oxidation of Tartaric Acid in Presence of Iron.—H. J. H. Fenton describes a crystalline product sparingly soluble in cold water, ether or acetic acid, but more readily in ethylic or methylic alcohol or in warm water or hot acetic acid. A full description of the crystals with methods employed is given by the author in Jour. Chem. Soc., 1894, 899.

Dihydroxytartaric Acid is a useful reagent for sodium salts. It precipitates sodium chloride in very dilute solutions, just as tartaric acid precipitates potassium salts.—Fenton, in Brit. and Col. Drug., 1894, 613.

Uroxanic and Oxanic Acids.—E. Sundwik.—An alkaline solution of uric acid, when kept for some months in a closed vessel, deposits crystals of the uroxanate and oxanate of the alkali. These simple oxidation derivatives of uric acid (uroxanic acid $C_4H_5N_3O_4$, and oxanic acid, $C_5H_8N_4O_6$) can, however, be prepared more rapidly as follows: If potassium permanganate is added to uric acid suspended in water, allantoin is formed; but if the permanganate is added very carefully and gradually in the cold to an alkaline solution, uroxanic acid is obtained, which crystal-

lizes out after the manganese dioxide has been filtered off. Its silver, sodium, potassium, barium, and calcium salts were prepared. Oxanic acid is prepared from the mother liquor from which the uroxanate has crystallized, by boiling, filtering, and then adding acetic acid in the cold.—Zeit. f. physiol. Chem., 1894, 335.

Derivatives of Veratric Acid and of Veratrol.—W. Heinisch.—When dimethylprotocatechuic acid (veratric acid), $C_6H_2(OCH_3)_2COOH$, is treated with nitric acid, it is converted into nitrodimethylprotocatechuic acid and mono- and dinitrodimethylcatechol. The nitro acid, separated from the product by extraction with dilute ammonia, melts at 187–188°. When nitrodimethylprotocatechuic acid is reduced with the theoretical quantity of stannous chloride and hydrochloric acid, it is converted into amidodimethyl catechol, $C_6H_3(OMe)_2.NH_2$. This crystallizes in slender, yellow crystals, melts at 80°, and is identical with the compound obtained by the reduction of mononitrodimethylcatechol; the latter melts at 91°. The platinochloride is a crystalline, yellow precipitate, and melts at 208°.

Dinitrodimethylcatechol melts at 128.2–128.3°, and is identical with the compound obtained by nitrating dimethylcatechol (veratrol) and metahemipicric acid. When reduced with stannous chloride and hydrochloric acid it is converted into diamidodimethylcatechol. The hydrochloride of the latter crystallizes with 2HCl, but loses 1 mol. of hydrogen chloride on exposure to air.—Monatsh. f. Chem., 1894, 229.

Alkaloids, Glucosides, etc.

Characteristic Reactions of some Alkaloids and Glucosides.—Ern. Formanek (Pharm. Post, xxviii, 179) publishes a list of very characteristic reactions produced by some of the alkaloids and glucosides when treated with certain chemicals, as follows: To a small quantity of the substance, contained in a porcelain capsule, is added a little nitric acid, and the mixture is evaporated slowly on a water-bath. The residue, after it has cooled, is treated either with ammonia vapors or ammonia water, then with an alkaline hydroxide, or with an alcoholic solution of potassium hydroxide, sometimes also with hydrogen sulphide, and potassium cyanide. Characteristic reactions were especially shown by the following alkaloids and glucosides:

1. *Aloin:* With nitric acid, aloin yields first a red color, quickly changing into yellow, and finally into very light yellow. The residue left on evaporation dissolves in alcohol with the production of a red solution, which, on addition of an alcoholic solution of potassium cyanide, is changed, first into a purple, and then into a rose-red solution. The dry, yellow residue, left on evaporation, is turned brown by ammonia vapors, and yellow upon the addition of a cold potassium-hydroxide solution; this last yellow solution, when evaported to dryness, yields a dark-purplish residue, producing with water a purplish-red solution.

2. *Amygdalin:* The residue left on evaporating its nitric-acid solution is of a yellowish color, which is changed into a pink-red by the action of ammonia vapors. Water of ammonia turns it into a brownish-red color, which soon fades away; with an alcoholic solution of potassium hydroxide, a rose-violet color is produced, gradually turning into muddy-yellowish brown.

3. *Brucine:* The red solution produced by the action of nitric acid on brucine, yields, on evaporation, a yellow residue, which is colored a grass-green by the action of ammonia vapors, remaining unchanged for several days if kept dry and in a vacuum. Prolonged action of ammonia vapors turns the residue brown. Aqueous or alcoholic solutions of the caustic alkalies give no characteristic coloration, but dampening the residue with hydrogen sulphide produces a pretty violet color. These very delicate reactions enable the detection of fractions of a milligramme; but if a considerable quantity of strychnine is present with the brucine, the reactions become less distinct.

4. *Cotoin* dissolves in nitric acid with a dirty-green color, changing into black; which, however, on warming, or on long standing, acquires an iron rust color. The residue left after evaporation is of a brown-red color, becoming on exposure to the action of ammonia vapors or addition of an aqueous solution of the caustic alkalies, a dirty green, which quickly changes to brown.

5. *Paracotoin* yields with nitric acid a red solution, changing rapidly to yellow, the residue left after evaporation is yellow, but becomes light-red, turning to brownish-yellow, on the addition of the caustic alkalies or of water of ammonia.

6. *Emodin* yields a yellow solution with nitric acid, leaving on evaporation, a brownish-red residue, becoming purple, then dirty red, with ammonia water. The caustic alkalies produce first a purple, then a brown coloration.

7. *Narcotine:* Nitric-acid solution is yellowish-green, and gives a residue of the same color. The latter is changed first to a dirty-green, then to a brown color, by the action of ammonia water. The caustic alkalies produce the same coloration, which changes to a pretty brick-red when warmed over a free flame.

8. *Physostigmine* yields a yellow solution, leaving a cinnabar-colored residue, which turns green on prolonged warming, and imparts the same color to water. Potassium hydroxide leaves the green color at first unaltered, but finally changes it to brown. Ammonia produces the same reaction, but a little more slowly.

9. *Salicin* leaves a light-yellow residue, rendered darker by the caustic alkalies or ammonia, and assuming a blood-red color when heated on the water-bath in the presence of potassium cyanide. Nitric acid decomposes salicin into nitro-salicylic, picric, and oxalic acids.

10. *Strychnine* leaves a yellow residue, becoming orange-yellow with ammonia, purplish red with watery solutions of the caustic alkalies; this color is more intense when using alcoholic solutions, the color changing to brown. These reactions are produced even in the presence of a considerable quantity of brucine, while the customary potassium bichromate test does not answer in such cases.

Other alkaloids and glucosides treated in the above manner, gave also color reactions; but the latter were too little characteristic to serve as tests for the respective substances. The reactions described above will indicate the presence of as little as 0.002 Mg. of the respective alkaloid or glucoside.

The Late C. R. Alder Wright's Collection of Alkaloids.—The valuable collection of alkaloids, which formed the subject of the well-known and laborious researches of the late C. R. Alder Wright, has been presented to A. P. Luff, of St. Mary's Hospital, by Mrs. Alder Wright.—Chem. News, 1894, 186.

Localization of Alkaloids in Plants.—In a paper in the Bulletin of the Belgian Microscopical Society (1894), Clautrian describes the mode of distribution of the alkaloids in a variety of plants, which he arranged under five types, viz.; (1) In a layer of cells lying between the endosperm and the true testa (*Atropa belladonna*, *Datura stramonium*, *Hyoscyamus niger*); (2) in two layers, especially in the outer one, between the endosperm and the pericarp; also, to a smaller extent, in the epiderm, and in the cells which accompany the vascular bundles (*Conium maculatum*); (3) in the endosperm, especially in its peripheral cells (*Aconitum napellus*, *Delphinium stahpisagria*); (4) in all the cells of the endosperm, and to a smaller extent in those of the embryo (*Strychnos nux-vomica*); (5) apparently in the cotyledons and plumules (*Lupinus albus*). The alkaloids take no active part in germination, but are formed in the seedling by decomposition of the albuminoids. In *Papaver somniferum* the amount of alkaloids decreases as the seeds ripen, and this is accompanied by an elimination of nitrogen. Their chief function here appears to be to protect the plant from consumption by animals.—Pharm. Jour. Trans., 1894, 355.

Sugars from Glucosides—Isolation of.—E. Schunck and L. Marschlewsky confirm their previous statement that the sugar obtained by hydrolyzing datiscin is rhamnose. The sugar formed by hydrolyzing lupinin gives an osazone melting at 204°, identical with ordinary glucosazone. In as much as lupinin sugar is dextro-rotatory and fermentable, the authors consider the proof that it is identical with ordinary glucose to be complete. Rochleder and Schwarz consider that æsculin on hydrolysis yields a sugar which is not identical with glucose. The authors have prepared osazone from this sugar; it melts at 205–206° C., and in all its other

properties is identical with glucosazone. The same remarks apply to the sugars from rubiadin and arbutin; in the latter case, the melting points of the sugar itself (hydrated and anhydrous) are shown to be the same as those of glucose. The authors likewise prove conclusively that the sugar from phloridzin is ordinary glucose. The view recently advanced by Hesse that the freshly prepared sugar is subsequently converted into glucose, perhaps through the agency of micro-organisms, is negatived by the fact that the sugar prepared by the authors was kept sterilized, and it was found to be identical with glucose a fortnight after its preparation. The authors have prepared the sugar from crocetin, and converted it into the osazone. This was homogeneous, and had the properties of glucosazone. The sugar from picrocrocin also gave glucosazone.—Ann. der. Chem., 1894, 349.

Aconitine Aurichloride.—W. R. Dunstan and H. A. D. Jowett have confirmed their previous results; the α-aurichloride cannot be regarded as a trihydrate, since it contains 19.64 per cent. of gold, the formula $C_{33}H_{45}NO_{12}$, $HAuCl_4$ requiring 19.89 per cent., or using Freund's formula for aconitine, 19.93 per cent., whereas a trihydrate requires either 18.86 per cent. or 18.89 per cent., depending on which formula is taken. On heating at 100–120° during many hours and weighing at intervals, the total loss was much less than that required for the trihydrate, although the salt had slightly decomposed. After this prolonged heating, the substance still melted very close to its original point. Moreover, they have now succeeded in producing the α-aurichloride in the absence of water by crystallizing from anhydrous acetone. The authors have also examined the substance which Freund and Beck regard as an alcoholate of aconitine aurichloride. The salt prepared by the method they describe closely resembles the β-aurichloride in appearance. The air-dried salt melted indefinitely between 145–152°, but (after drying at 100°) at 152°. By drying this substance under different conditions, the authors find that the loss is variable, but in no case does it amount to the percentage required for an alcoholate, 4.46 or 4.47 per cent. They conclude that this substance is merely the β-aurichloride with a small quantity of alcohol still adhering to it; this alcohol is slowly lost when the salt is exposed to air.—Chem-News, 1895, 99.

Aconite Alkaloids.—Part viii, of the papers of Dunstan and others (Dunstan and Harrison) is devoted to showing that the picraconitine of Groves and Alder Wright was impure isaconitine. Part ix, (Dunstan and Carr) states that when aconitine is heated at its melting point a new alkakaloid, pyraconitine, is formed thus:

$$C_{33}H_{45}NO_{12} = C_2H_4O_2 + C_{31}H_{41}NO_{10},$$

an amorphous varnish, sparingly soluble in water, readily in alcohol,

chloroform and ether; non-poisonous in small doses. Its hydrobromide, hydrochloride, and hydriodide have been prepared; its aurichloride by adding auric chloride to a solution of the hydrochloride; on hydrolysis it yields pyraconine (*cf.* aconitine and aconine) and benzoic acid. Pyraconine is amorphous, and differs from aconine in several respects. It is soluble in water and ether. and forms crystalline salts.

$$C_{31}H_{41}NO_{10} + H_2O = C_7H_6O_2 + C_{24}H_{37}NO_9.$$
Pyraconitine = Benzoic acid + Pyraconine

It is possible that the liberation of acetic acid by conversion of aconitine into pyraconitine may be used to determine the alkaloid. Part X. (Dunstan and Carr).—Aconine before (last year) was shown to be produced by hydrolysis of aconitine, or isaconitine. Now it is concluded that in the hydrolysis of aconitine, isaconitine is first produced, and from this aconine. In a lecture before the Pharmaceutical Society, Dunstan chiefly brings out the relationship of aconitine and isaconitine, and describes the new body—pyraconitine. It is to be noted how each succeeding publication on the aconitine alkaloids shows more and more the tentative nature of the reasonings in them. Aconitine ($C_{33}H_{45}NO_{12}$) is acetyl-benzoyl-aconine, and on hydrolysis yields (1) benzoyl-aconine (isaconitine) and acetic acid; (2) aconine and benzoic acid (from the isaconitine). The production of acetic acid from aconitine may lead up to a process of estimation of the alkaloid by this method. Pyraconitine is formed by heating dry aconitine alone, and from this pyraconine and benzoic acid may be produced by hydrolysis. Dunstan sums up the alkaloids thus: 1. Aconitine (acetyl-benzoyl-aconine) $C_{33}H_{45}NO_{12}$. 2. Napelline, isaconitine or picraconitine (benzoyl-aconine), $C_{31}H_{43}NO_{11}$. 3. Pyraconitine, $C_{31}H_{41}NO_{10}$. 4. Aconine, $C_{24}H_{39}NO_{10}$. 5. Pyraconine, $C_{24}H_{37}NO_9$. Freund and Beck (see Berichte, xxvii, 433) give $C_{34}H_{45}NO_{11}$ or $C_{34}H_{47}NO_{11}$ as the formula for aconitine, and state that the body formed by long continued boiling of this alkaloid has the formula $C_{32}H_{45}NO_{10}$, and prefer to call it picroaconitine—rather than isaconitine—as being that of the name given by Wright to a similar body. The aconine of Wright they consider to be identical with a body they obtain by boiling alcoholic potash and picroaconitine, but its formula is $C_{25}H_{41}NO_9$, not as per Wright or Dunstan. Freund and Beck are positive as to their results which they state as above.—Brit. and Col. Drug., 1894, 644.

Chemical History of Aconitine.—M. Freund replies to W. R. Dunstan (Ber. d. Chem. Ges., 1895, 192). Beck and Freund (loc. cit., xxvii., 433) state that the formula $C_{33}H_{45}NO_{12}$ assigned to aconitine by Wright, and modified by Dunstan, is incorrect, and that it should be replaced by $C_{34}H_{47}NO_{11}$.

While the hydrolytic splitting of aconitine was represented by Wright—and also by Dunstan—by the equation—

$$\left.\begin{matrix} C_{33}H_{45}NO_{12} \\ H_2O \end{matrix}\right\} \quad = \quad \left\{\begin{matrix} C_{26}H_{41}NO_{11} \\ C_6H_5.CO_2H, \end{matrix}\right.$$

they showed, on the contrary, that this alteration takes place in two phases—

$$\text{I.} \quad C_{34}H_{47}NO_{11}H_2O \quad = \quad CH_3.CO_2HC_{32}H_{45}NO_{10}$$
$$\text{II.} \quad C_{32}H_{45}NO_{10}H_2O \quad = \quad C_6H_5.CO_2HC_{25}H_{41}NO_9.$$

They further produced evidence that the product $C_{32}H_{45}NO_{11}$, resulting according to Equation I., was identical with the "isaconitine" of Dunstan, to which he had assigned the formula $C_{33}H_{45}NO_{12}$ as being an isomer of aconitine.

They also showed that the product $C_{25}H_{41}NO_9$, resulting according to Equation II., was identical with aconine, for which Dunstan had confirmed the formula $C_{26}H_{41}NO_{11}$, assigned to it by Wright.

Lastly, they deduced from their observations the ultimate conclusion that aconitine is to be regarded as acetyl-benzoyl-aconine—

$$C_{25}H_{39}NO_9 \begin{matrix} \diagup COCH_3 \\ \diagdown COC_6H_5. \end{matrix}$$

Dunstan asserts that the observation that aconitine splits up first into acetic acid and isaconitine had already been published by him on January 27th, in the "Proceedings of the Chemical Society" (1894).

In contradiction of that statement, Freund affirms that in those "Proceedings" isaconitine is throughout treated of as the isomer of aconitine, and not as a product of its splitting.

Dunstan has published in the same number of the "Proceedings" the observation that aconitine heated dry to 190° C., loses one molecule of acetic acid. In the notice published in the Berichte, he says: "The obvious conclusion that aconitine must be acetyl-benzoyl-aconine, and the so-called 'isaconitine' benzoyl-aconine, though not stated in so many words in the abstracts, is given in the original papers which appear in the number of the Journal of the Chemical Society now being published."

Freund mentions that the production of acetic acid in the hydrolysis of aconitine had already been demonstrated in 1892 by Ehrenburg and Pürfurst. There is not in the "Proceedings" one single word to indicate the above-mentioned "obvious conclusion." Only in one place is it mentioned that the authors (Dunstan and Carr) are at present engaged in investigating "whether aconitine may not be an acetyl derivative which loses its acetyl group on hydrolysis," and then there is in the "Proceedings" this further statement: "If the latter view should prove to be correct, the nomenclature and formulæ of aconitine derivatives will need entire revision."

In these "original papers" the point which is referred to in the abstracts as having to be ascertained, has all at once become a demonstrated fact.

The nomenclature and the formulæ of aconitine derivatives are altered—aconitine is represented as acetyl-benzoyl-aconine, and isaconitine as benzoyl-aconine. Dunstan appears, however, to have overlooked the fact that in the first of the three papers—in the same number—isaconitine is expressly represented to be an isomer of aconitine, and on that account it is proposed that the name "picraconitine" should be abandoned. In favor of his new views, Dunstan was compelled to throw overboard the formulæ he had employed for several years. Since the old isaconitine formula, $C_{33}H_{45}NO_{12}$, requires almost the same values as the newly adopted one, $C_{31}H_{45}NO_{11}$, Dunstan resolved upon making that alteration on the basis of a single gold determination.

Calculated for the old formula	21.46 per cent.
" new "	22.50 "
Found	22.18 "

although it was not in accord with a whole series of analyses of the gold salt, which agreed well with the old formula. No new analytical data at all were given for aconine, but the old formula, $C_{26}H_{39}NO_{11}$, was altered without further consideration to $C_{24}H_{39}NO_{10}$.

Acetyl Derivative of Benzaconine and Aconitine.—W. R. Dunstan and F. H. Carr have made a number of experiments in the hope of being able to convert benzaconine into aconitine by introducing an acetyl group into it. These experiments have so far been unsuccessful, but several new compounds have been obtained, both from benzaconine and from aconitine, the analyses of which serve to further confirm the formulas which the authors have previously proposed for these alkaloids, $C_{13}H_{43}NO_{11}$ and $C_{33}H_{45}NO_{12}$, whilst the analytical results do not bear out the formulas proroposed by Freund and Beck, $C_{32}H_{45}NO_{11}$ and $C_{31}H_{47}NO_{11}$. By acting on benzaconine dissolved in chloroform with acetic anhydride during 24 hours at the ordinary temperature, an amorphous base is obtained which forms crystalline salts; the hydrobromide melts at 263°. The substance does not seem to be toxic. When hydrolyzed by heating with water in a closed tube, it furnishes acetic acid and benzaconine.—Chem. News, 1895, 99. (See also Jour. Chem. Soc., 1895, 459.)

Toxicity of Aconitine.—M. Mouquet states that a horse weighing about 400 kilos died some 35 minutes after the subcutaneous injection of 9 Mgm. of aconitine nitrate.—Rep. de Pharm., 1895, 180; Pharm. Jour. Trans., 1895, 1890.

Adonidin.—Adonidin is an uncommonly hygroscopic body; but the "baking" does not impair the physiological action, and the medicament may be employed in this state without hesitation. It is advisable in dispensing to treat adonidin like eserine—that is, to throw the open tube into a definite quantity of water so as to obtain a perfect solution of the adonidin.

As it is generally prescribed dissolved in chloroform-water, it is recommended to add to the water used as the solvent a few drops of chloroform to protect the solution against fermentation.—Merck's Report, 1894, 31.

Aloin.—C. A. Serre demonstrates the various qualities of resin using typical samples from American, English and German makers of "aloin" and tabulates them as follows:

	A.	*B.*	*C.*	*D.*
	American No. 1. Bright-pale.	American No. 2.	English. Greyish.	German. Deep bright.
Color	Yellow.	Brown.	Yellow.	Yellow.
Melting point	116°	140°	145° (Softens only.)	142°
Resin	—	5.8 per cent.	—	—
Ash	—	1.4 per cent.	4.7 per cent.	1.3 per cent.

A very good method of ascertaining if aloin is absolutely free from resin is by adding 20 Cc. of water in a test tube to 1 grain of the finely powdered sample, shaking, and allowing to stand one minute. The solution should be perfectly clear. With the exception of A, not one of the above stood the test. All samples not meeting with the requirement should be looked on as suspicious.—Drug. Circ., 1895, 8.

Aloin.—D. Ramy Brown says the B. P. states that aloin is insoluble in ether, but upon examining several samples from different sources he found that they were all soluble in pure ether, only slight residues of from 0.7 to 1.3 per cent. ultimately remaining undissolved. The residues in every case were mixtures of organic and inorganic matter. Aloin is, however, only very sparingly soluble both in cold and boiling ether.—Pharm. Jour. Trans., 1895, 866.

Anagyrine Hydrobromate.—$C_{14}H_{18}N_2O_2HBr_2$, is a salt of the alkaloid obtained from the seed of *Anagyris foetida*. It occurs as small, white, shining scales, which are soluble in water and in alcohol, and melt between 265 and 266° C. Physiological investigations by Hardy and others have proved anagyrine to be toxic; therapeutic data are wanting.—Merck's Report, 1894, 36.

Artemisin is an accompaniment of santonin. While working on the seeds of Artemisia maritima, E. Merck (Bericht ueber das Jahr 1894,) discovered, in the final mother-liquors, a well-crystallizing body, which, though resembling santonin, proved, on closer investigation, to be a new compound. This "artemisin," as it was named, was purified by repeated crystallization from alcohol with the aid of charcoal. But the white crystalline powder thus obtained was found still to contain santonin, which was then removed by the following procedure: Chloroform was poured over the crystals; solution at first ensued, but a moment later the whole solidified into a crystalline mass, consisting of a compound of artemisin

and chloroform. This was recrystallized from boiling alcohol, the santonin remaining in solution in the mother-liquors. At 80° C. the artemisin-chloroform lost all its chloroform, and after a final crystallization from absolute alcohol it was obtained in pure form. Artemisin melts at 200° C., and dissolves in 60 parts of boiling water to form a neutral liquid, from which, on cooling, compact needles of the unaltered substance separated. It is soluble in three parts of boiling absolute alcohol. On preparing a 1 : 6 boiling solution and adding 20 Cc. of tepid water, the solution does not become milky, large columnar crystals forming only after some length of time. This behavior shows that artemisin is much more readily soluble in water and alcohol than santonin is. When exposed to direct sunlight, artemisin slowly assumes a yellow coloration; but neither the intensity nor the rapidity of this change is at all comparable with the corresponding behavior of santonin. 0.1 Gm. of artemisin dissolves in a mixture of 1 Cc. each of sulphuric acid and water without color. On adding a drop of ferric-chloride solution and heating, the liquid becomes faintly turbid, and assumes an intense yellowish-brown coloration. Under similar conditions santonin gives a characteristic violet coloration. On heating 0.1 Gm. of artemisin and 1 Gm. of sodium carbonate with 4 Cc. of water, to ebullition, the fluid assumes a beautiful carmine color, disappearing after a minute, and not returning, even if the liquid be again heated to ebullition. In the same treatment of santonin, the liquid remains colorless; but a carmine coloration is known to arise when santonin is heated with alcoholic potassium or sodium carbonate solution. Artemisin is freely soluble in hot, aqueous soda solution; when heated with alcoholic soda solution, the characteristic carmine-red coloration appears as solution proceeds. The formula assigned to artemisin is $C_{15}H_{18}O_4$.

Arecoline is recommended by Froehner (Pharm. Ztg., 1894, 405) as a succedaneum for pilocarpine and eserine in veterinary practice. Arecoline, $C_8H_{13}NO_2$, is regarded as the active constituent of areca catechu (areca nut). In its uncombined state it is a colorless, oily, strongly alkaline volatile fluid, miscible with water, alcohol, ether, and chloroform in every proportion. It is a poisonous alkaloid, also stimulating intestinal peristalsis and thus acting as a tænifuge. However, it has been but little used in human therapy. Froehner states that arecoline is 10 times stronger, as a laxative, than pilocarpine, and fully as powerful as eserine; while its action equals about 1000 times that of powdered areca nut. On the strength of his experience, he regards 10 Cgms. of arecoline (or 100 Gms. of areca nut) as the maximum dose for horses, and 25 Cgms. of the alkaloid (or 250 Gms. of the nut) as the maximum dose for oxen. Arecoline is best prescribed in the form of the crystalline hydrobromate.

Argonin.—Under this name a new silver preparation has been placed upon the market, which is prepared according to a process devised by

Liebrecht and Röhmann. The process consists in precipitating a solution of silver nitrate and casein soda with alcohol. Argonin is described as a fine, white powder which dissolves in water with a neutral reaction. The silver in the compound is not precipitated by chlorides, ammonium sulphides, etc. As the result of experiments upon species of gonococci, argonin is recommended by Meyer and Jaddassohn as an efficacious disinfectant.—Apoth. Zeit., 1895, 430; Pharm. Jour. Trans., 1895, 1193.

Different Deportment of Atropine and Strychnine in Vitali's Reaction.—If strychnine is moistened with nitric acid, evaporated to dryness, and then the dry, cold residue is treated with alcoholic solution of potassium hydrate, a red to violet color results. This reaction can readily be mistaken for that of atropine (Vitali's reaction).

Vitali calls attention to the following differences:

1st. After the oxidation of the alkaloid, and all of the nitric acid has been driven off, atropine emits a fragrant odor, while the strychnine residue remains odorless.

2d. Strychnine on being moistened with nitric acid turns a yellow color; this remains even after drying, while atropine under the same conditions retains its white color.

3d. If the dry, cold residue remaining after evaporating off the nitric acid from the atropine is moistened with alcoholic potash a violet color results. If this residue is again evaporated to dryness and then moistened with alcoholic potash a second time the violet color is intensified. In this case of strychnine the violet color produced by the action of alcoholic potash, disappears on drying it to a reddish yellow color.

4th. On evaporating atropine to dryness with nitric acid and then moistening the residue with aqua ammoniæ, a yellow colored solution results; this on addition of alcoholic potash turns a violet color. The same experiment repeated with strychnine gives on addition of aqua ammoniæ an orange-red color, while the subsequent addition of the alcoholic potash produces only a transient violet, which quickly passes into a blood-red colored solution. If the above ammoniacal solution of the oxidized alkaloidal residue be shaken with chloroform and the chloroformic solution evaporated to dryness, in the instance of atropine an almost colorless residue results, which upon addition of alcoholic potash gives rise to a permanent violet color. Strychnine under the same circumstances, imparts to chloroform only a faint yellow color; this solution on evaporation leaves a yellowish colored residue which on moistening with alcoholic potash gives rise to a bright orange red coloration.—Bull. Chim. Farm., 1894, 33–449.

Alkaloids of Berberis.—H. Pommerehue ascribes to oxyacanthine the formula $C_{19}H_{21}NO_3$; it is to be regarded as a tertiary base, and is strongly dextro-rotatory. The formula of berbamine he finds to be $C_{18}H_{19}NO_3$. From berberine he has prepared a neutral sulphate, a true bicarbonate, and a well-defined hydrocyanide.—Arch. der Pharm., 1895, 173.

Brasilin and Hæmatoxylin.—These two bodies by methylation produce methyl derivatives. Other derivatives [as alkyl] are also produced, which are only noticed in substances standing in close relationship to xanthone. Baeyer has also shown that fluoresceïn and eosin, with respect to a hydroxyl group, behave exactly like the substances of the xanthone group, and R. Meyer has pointed out that the fluoran, the root-substance of fluoresceïn, is a body of perfectly analogous constitution to xanthone. Therefore, in brasilin and hæmatoxylin we have compounds similarly constiuted, in all probability to xanthone or fluoran.—J. Herzig, in Monatsh. f. Chem., 1894, 139.

Isomeride of Brucine Methiodide.—E. Lippmann.—On heating an alcoholic solution of brucine hydriodide with methylic iodide, in sealed tubes, at 100°, a colorless salt is obtained, which is converted by ammonia into an isomeride of brucine methiodide. It crystallizes from water in slender prisms, which become transparent at 198–200°, and decomposes rapidly at 260°. The previously described isomeride, on the other hand, blackens at 270°, and decomposes at 280°. The formation of these two isomerides is easily understood when it is remembered that the two nitrogen atoms in brucine are quite different in their functions, one occurring in a quinoline ring, the other in what is probably either an indole or a carbazole group.—Monatsh. f. Chem., 1894, 116.

Localization of Brucine and Strychnine.—Suavan states, as the results of some preliminary micro-chemical tests on the seeds of Strychnos nux vomica and S. gaultheriana, that these alkaloids of nux vomica are found solely in the cells of the albumen and of the embryo, and not in the seed coats. Further, the reactions for strychnine and brucine do not take place in the same cell, so that it would appear that the alkaloids exist separately in adjoining anatomical elements. The author expects to continue his researches in this direction.—Jour. Pharm. Chim., 1895, 497.

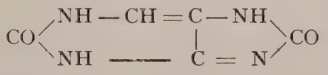
Derivatives of Caffeïne.—L. Crämer.—Methylamidocaffeïne, $C_8H_9N_4O_2$.NHMe, is readily obtained in a similar manner to amidocaffeïne by heating chlorocaffeïne with methylamine and alcohol at 100°; it crystallizes from hot water in slender, colorless needles, m. p., 310–315° C., simultaneously becoming brown. The picrate crystallizes in yellow plates. Ethylamido caffeïne, $C_8H_9N_4O_2$.NHEt, is prepared in a similar manner, and also forms slender needles, m. p., 226–230° C., with partial sublimation. Hydrazidocaffeïne, $C_8H_9N_4O_2.N_2H_3$, prepared by boiling chlorocaffeïne with an aqueous solution of hydrazine hydrate, crystallizes in slender, colorless needles, melting and completely decomposing at 240°. It reduces Fehling's solution on warming, and yields a hydrochloride, which crystallizes well and dissolves readily in warm water. With benzaldehyde, the hydrazine compound forms benzylidenehydrazidocaffeïne, $C_8H_9N_4O_2$.N_2H : CHPh; this crystallizes in slender needles, melting at 270° to a

brown liquid. On treatment with nitrous acid, it is converted into azimidocaffeïne, $C_8H_9N_4O_2N_3$, which forms colorless needles, sparingly soluble in water, and rapidly becomes red in the air when moist. Anilidocaffeïne, $C_8H_9N_4O_2.NHPh$, crystallizes from alcohol in colorless needles, m. p., 260° C., and decomposing at a slightly higher temperature; the hydrochloride, $C_{14}H_{15}N_5O_2,HCl$, also crystallizes in needles, which are dissociated by water. Nitrosoanilidocaffeïne, $C_8N_4H_9O_2.NPh.NO$, decomposes at about 225°, and gives Liebermann's reaction. Benzoylanilidocaffeïne, $C_8N_4H_9O_2.NPhBz$, is obtained by boiling anilidocaffeïne with benzoic chloride, and after crystallization from alcohol, m. p., 225° C. By the action of alcoholic potash on anilidocaffeïne at 120°, it is converted into anilidocaffeïdine, the sulphate of which crystallizes well; the action of hydrochloric acid and potassium chlorate converts it into chloranil and dimethylalloxan. Paratoluidocaffeïne, m. p., 270–275° C., orthotoluidocaffeïne at 230° C., and metaxylidocaffeïne at 210–212° C.—Ber. d. Chem. Ges., 1894, 3089.

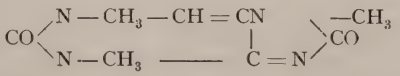
Caffeine.—The recent synthesis of caffeine from dimethyl urea and malonic acid by Fischer and Ach has been described as being the first synthesis of this useful compound. As a matter of fact a synthesis, quite as elementary as the one recently announced, has been long known. Starting from guanine, $C_5H_5N_5O$, xanthine, $C_5H_4N_4O_2$, is prepared by the action of nitrous acid thus:

$$C_5H_5N_5O + HONO = C_5H_4N_4O_2 + N_2 + H_2O$$

Xanthine is converted into its lead compound, which is methylated in the usual way. The product is a dimethyl xanthine, or theobromine isomeric with theophylline, the intermediate body in the recently announced synthesis. The constitution of xanthine is



and theobromine and theophylline are two isomeric dimethyl derivatives of it. Either of them yields caffeine when further methylated, which is, of course, trimethyl xanthine of the constitution



—Mathemat. u. naturwissensch. Mitth. aus den Sitzungsber. der königl. preuss. Akad. der Wissensch. zu. Berlin, 1895, 171.

Coffearine,—Paladino describes this new alkaloid in coffee. Its physical and physiological properties are quite different from those of caffeine. On frogs it acts as a narcotic poison, 0.2 Gm. proving fatal. The formula

assigned it is $C_{14}H_{16}N_2O_4$. It is prepared by repeated extraction of finely ground coffee with water rendered alkaline by milk of lime. Basic lead acetate is added to the strained liquid, the precipitate filtered off, excess of lead removed from the filtrate by sulphuric acid, the solution concentrated and exhausted with chloroform to remove the caffeine. The liquid is then heated on a water bath with excess of sulphuric acid to expel acetic acid, the syrupy mass taken up with water, the liquid filtered and decolorized by heating with animal charcoal. The solution is then much diluted, and when cold, Dragendorff's reagent is added with constant shaking until the flocculent precipitate becomes crystalline. The precipitate is filtered off, washed and decomposed by warming with H_2SO_4. After filtration the liquid is warmed on the water bath, neutralized with $PbCO_3$ and again filtered. The precipitation with Dragendorff's reagent is repeated several times until the precipitate of the double iodide of the alkaloid and bismuth is perfectly crystalline. Oxide of silver is added to the clear liquid resulting from the decomposition of the double iodide, and after filtration the hydrochloride of the alkaloid is precipitated with HCl.—Pharm. Era, 1895, 814. (See also Gazz. Chim. ital., 1895, 104).

Physiological Action of Chlorocaffeine and Cyano-Caffeine. — J. W. Pickering.—The introduction of an atom of chlorine into the caffeine molecule considerably modifies its physiological action, as tested on the hearts of embryo chicks, frogs and human beings. It appears that a chemical stimulus or depressant may exert its action, due to one or more molecular groups in its substance; and that one group of atoms may modify the physiological action of other groups of atoms in the same molecule. This apparently occurs in the case of chlorocaffeïne; the three methyl groups would tend to induce tonic contraction of the heart muscle, and the chlorine atom to produce an atonic condition; chlorocaffeïne (chlorotrimethylxanthine) produces far less tonic contraction of the heart than caffeïne itself. Thus here is a case of physiological antagonism going on in the interaction of the parts of one molecule and living contractile tissue. In the introduction of cyanogen into the caffeïne molecule, the cyanogen overpowers the physiological action of the three methyl groups, and the cyanocaffeïne acts more like a cyanogen derivative than a xanthine derivative, being almost immediately fatal to the heart of chick and frog; there is no evidence of tonic contraction at all, and the heart dies in extreme diastole. The possibility of the living tissue decomposing the chlorocaffeïne and cyanocaffeïne into the free chlorine, cyanogen and caffeïne respectively was not overlooked, but tests failed to give evidence of these substances. A solution of caffeïne in chlorine water acts differently, the free chlorine being very toxic to the heart. Chlorocaffeïne is a powerful diuretic. and apparently also a cerebral stimulant.—Jour. f. Physiol., 1895, 395; Jour. Chem. Soc., 1895, 238.

Two Cactus Alkaloids.—A. Heffter.—Anhaline, $C_{10}H_{17}NO$, is extracted

from Anhalonium fissuratum; it crystallizes in colorless, stellate prisms, and melts at 115°. The solution in concentrated sulphuric acid is colorless, even when warmed, but becomes green on the addition of a drop of nitric acid. The most characteristic reaction is the production of a yellow color with nitric acid, changing to orange-red with potash. The sulphate, $(C_{10}H_{17}NO)_2,H_2SO_4 + 2H_2O$, crystallizes in colorless, lustrous plates, and melts at 197°. The hydrochloride, $C_{10}H_{17}NO,HCl$, crystallizes in slender, hygroscopic plates. The oxalate is anhydrous and resembles the sulphate. The yield of alkaloid was very small, only 0.2 Gm. from 1 kilo of the dry plant. Pellotine, $C_{13}H_{21}NO_3$, so called from the Mexican name "pellote," of Anhalonium Williamsi, crystallizes in colorless, transparent, anhydrous plates, and melts at 110°. The yield is 0.89 per cent. of the fresh plant. It dissolves in sulphuric acid with a slight yellow color, changing to deep red with nitric acid. The phosphotungstate and phosphomolybdate are voluminous, the former white, the latter lemon-colored. The potassio-mercuric iodide crystallizes in pale yellow prisms; the potassio-cadmium iodide in colorless, rectangular plates; the potassio-bismuth iodide is amorphous at first, but changes to needles; the iodo-potassium iodide crystallizes in slender needles. The picrate crystallizes in stellate prisms. The platinochloride is deposited in golden-yellow crystals; the hydrochloride, $C_{13}H_{21}NO_3,HCl$, in rhombic prisms. The oxalate crystallizes in needles. The methyliodide, $C_{13}H_{21}NO_3,MeI + H_2O$, is deposited in colorless prisms melting at 198°. The methochloride, $C_{13}H_{21}NO_3,MeCl$, crystallizes in slender, colorless needles melting at 226°. Determinations by Zeisel's method show that pellotine contains two methoxy-groups. By the action of hydrochloric acid at 100° methylic chloride is eliminated and a base formed in small quantity, which yields a platinochloride crystallizing in orange-red prisms.—Ber. d. Chem. Ges., 1894, 2975.

Cadaverine and Choline from Putrid Horseflesh.—W. Gulewitsch.—These two substances were obtained from putrid horse-flesh in quantity, and a number of their compounds were prepared and analyzed. Among these may be mentioned the compound of cadaverine and mercuric chloride, $C_5H_{12}N_2.2HCl,4HgCl_2$; at 135°, this loses 18.33 per cent. of mercuric chloride. The platino-chloride, $C_5H_{14}N_2,H_2PtCl_6$, was prepared. The crystalline form of different ptomaine derivatives appears to vary a good deal. The name ptomatine is suggested as more grammatically correct than ptomaïne.—Zeit. f. Physiol. Chem., 1894, 287.

Cephælina Crystallisata.—Cephælina ($C_{14}H_{20}NO_2$) crystallizes from ether in fine interlacing needles, m. p., 120° C. Soluble in caustic soda, in molecular proportions, the salts are amorphous. When fresh it is of a snowy white color, but turns yellow even when light is excluded after twenty-four hours. It is an alkaloid obtained from emetine (extracted from ipecac), being split up into two components: *cephæline*, and an alkaloid, *emetine*. Merck has corroborated the labors of Paul and Cownley.—Merck's Report, 1894, 48.

Derivatives of Chimaphilin.—W. E. Ridenour obtained a tetra-chlor-derivative of chimaphilin ($C_{24}H_{21}O_4Cl_4$). Acetic anhydride had no action on chimaphilin. By the action of nitric acid a nitro derivative of an oxidation product of chimaphilin was obtained in lemon-yellow tabular crystals, m. p., 153–154° C.—Amer. Jour. Pharm., 1895, 239.

Chelidonine Reactions.—Battandier reports that on mixing a drop of guaiacol and sulphuric acid (sp. gr. 1.84) at the bottom of a porcelain capsule, and placing small pieces of chelidonine near the edge, in a few minutes bright carmine streaks of great intensity descend from the pieces, the reaction persisting for some time. With guaiacol carbonate the coloration is less intense. When the guaiacol is replaced by thymol, a rose coloration is obtained, which lasts for more than twenty-four hours, and only becomes slightly purple as hydration of the acid takes place. The chelidonine should be introduced before the acid gives a blue color with the thymol. Ordinary phenol gives only a slight rose tint with chelidonine and sulphuric acid; oil of cloves gives a purple color; naphthol, dark green streaks; β-naphthol, brown streaks passing to violet; pyrocatechin, a rose color passing to violet; hydroquinone, resorcin and phloroglucin, yellowish streaks; pyrogallol, red, turning to yellow, and then disappearing; and gallo-tannic acid, yellow, passing to bright-green. All oxidizing agents produce the same green coloration that nitric acid does when added to chelidonine dissolved in sulphuric acid.—Compt. rend.; Drug. Circ., 1895, 82.

CINCHONA ALKALOIDS.

New Compounds of Cinchona Alkaloids with Ethylic Iodide.—Z. H. Skraup and F. K. v. Norwall.—In this paper particulars are given of work which has been previously published in outline. In order to distinguish between the isomeric compounds of an alkaloid with ethylic iodide, the authors suggest one compound should be represented by the name of the alkaloid preceded by the term "iodoethyl," whilst the second should be represented by a name in which that of the alkaloid is followed by the term "ethiodide." For example, they propose to call the colorless product obtained from free cinchonine and ethylic iodide, "iodoethylcinchonine," whilst the yellow substance prepared from cinchonine hydroxide and ethylic iodide would be named "cinchonine ethiodide."—Monatsh. f. Chem., 1894, 37.

Constitution of the Additive Compounds of the Cinchona Alkaloids with Ethylic Iodide.—Z. H. Skraup has examined the action of oxidizing agents on the additive compounds of ethylic iodide with the cinchona alkaloids in the expectation that the pyridine ring of the so-called "first half" would be opened. The results obtained in the case of cinchonine ethiodide have not confirmed this supposition, but are of interest, inasmuch as they confirm the author's previous supposition that the ethyl group

combines with the nitrogen atom of the quinoline ring of the "second half" of the molecule. The hydriodide of cinchonine ethiodide was treated with the requisite quantity of silver nitrate to remove the hydrogen iodide, potassium permanganate gradually added to the resulting aqueous solution in the cold, and the product, after filtering from manganese dioxide, and cadmium chloride. From the first two precipitates, no crystalline products could be obtained, but from the last a substance was separated, crystallizing from water in pointed prisms of the color of chromium trioxide. It melts and decomposes at about 200°, and has the composition $C_{12}H_{12}NO_2I + H_2O$, the water of crystallization being readily given off. From its composition and properties, it appears probable that it is an additive compound of cinchonic acid and ethylic iodide, and this has been confirmed by its direct formation from these two substances. It follows, therefore, that in the original cinchonine ethiodide the ethyl group is in combination with the nitrogen atom of the quinoline group of the second half of the alkaloid molecule. When cinchonic acid ethiodide is treated with silver chloride, it is converted into the corresponding ethochloride, which crystallizes in colorless prisms and melts at 229°.—Monatsh. f. Chem., 1894, 433.

Crystalline Cinchonicine.—F. Roques.—This substance has hitherto been known only as vitreous and resinoid, but the author has obtained it in anhydrous amber-yellow crystals, forming crystals often more than 10 Mm. in length, by 3 Mm. in breadth, but presenting curved surfaces. Their optical properties indicate a triclinar form. They are soluble in benzene, toluene, acetone, chloroform and alcohol, but they have not hitherto been re-crystallized from these solutions. The author is continuing his researches and extending them to quinicine.—Compt. rend., 1895, 1170; Chem. News, 1895, 293.

Cinchonifine.—E. Jungfleisch and E. Léger.—Cinchonifine is best obtained by crystallizing from large quantities of strong, boiling alcohol that portion of the cinchonine bases which is insoluble in ether or in dilute alcohol. The cinchonifine separates on cooling, whilst apocinchonine and cinchonibine remain in solution. The purification is accelerated by converting the cinchonifine into basic sulphate, which is crystallized repeatedly from hot water, the free base being subsequently crystallized from boiling alcohol. Cinchonifine forms small, brilliant, colorless, anhydrous needles, insoluble in water, ether or dilute alcohol, and very slightly soluble in alcohol or in chloroform, but soluble in a mixture of the two. It melts at 273.6° C., and, when more strongly heated, decomposes and volatilizes. It is dextrogyrate in alcoholic solution, at 17° $[a]_D = + 201.4°$ with a solution of 0.75 Gm. in 100 Cc., but the rotatory power increases with the concentration. A 1 per cent. solution in dilute hydrochloric acid (2HCl) gives $[a]_D = + 228.9°$, or with 4HCl + 226.3°, a 1.5 per cent. solution with 2HCl gives $[a]_D = + 225.13°$.

Cinchonifine is alkaline to litmus, but not to phenolphthalein; it yields two classes of salts which as a rule are very soluble in water and crystallize well. The basic hydrochloride forms silky needles which contain $2H_2O$, and melt at about 208°; the zincochloride forms anhydrous rhombic prisms. The aurochloride and platinochloride are yellow and imperfectly crystalline: the basic hydrobromide forms very soluble needles which contain $1H_2O$ and melt at about 221°; the basic hydriodide forms colorless, long, flattened prisms which contain $1H_2O$; the basic nitrate forms highly refractive, rhombic crystals, which contain $1H_2O$; the basic thiocyanate forms long, flattened, anhydrous prisms; the basic sulphate forms efflorescent, prismatic needles with $2H_2O$, but when anhydrous melts at about 188°, the basic oxalate forms long slender needles, which contain $1H_2O$, and are much more soluble in hot water than in cold; the basic succinate is very soluble in water, but insoluble in solutions of alkali succinates, and crystallizes in prismatic needles, which contain $1H_2O$; the basic tartrate forms flattened elongated prisms which contain $1\frac{1}{2}H_2O$ and melt with decomposition at about 209°; the normal tartrate is less soluble than the basic salt, and crystallizes in prismatic needles containing $4H_2O$.

Cinchonifine methochloride forms large, colorless needles, with $2H_2O$; the methiodide forms short, anhydrous prisms, which melt with decomposition at 251°, but if crystallized at a low temperature it forms thin plates which contain $2H_2O$. The dimethiodide forms very soluble lemon-yellow plates, which contain $1\frac{1}{2}H_2O$ and melt and decompose at about 223°. The ethiodide forms long, slender, colorless, anhydrous needles, which melt and decompose at about 251°, and are insoluble in ether; the diethiodide forms lemon-yellow anhydrous plates which melt with decomposition at about 225°. The ethobromide crystallizes with $3H_2O$ in bulky prisms, which melt and decompose at about 225°, and the diethobromide forms hard, anhydrous, crystalline crusts, which melt at about 218°.—Compt. rend., 1894, 536.

Isobutyl-cinchonine Hydrobromide.—F. Vial.—Cinchonine (10 parts), isobutylic bromide (5 parts), and isobutylic alcohol (10 parts), are heated in a sealed tube at 100° C. The product of this action is distilled in a current of steam, the residue extracted with water, and the concentrated solution set aside to crystallize. The solution of the crude crystals may be freed from the accompanying red coloring matter by extraction with chloroform. Isobutylcinchonine hydrobromide, $C_{19}H_{21}N_2O.C_4H_9,HBr + H_2O$ forms colorless orthorhombic crystals, the full measurements of which are given; when dehydrated, m. p., 176° C., it dissolves in water and in alcohol, but not in ether or chloroform. Its rotatory power in aqueous solution is $a_D = +125°$ ($p = 1$ in 100 v; $t = 17°$.)—Jour. Pharm. Chim., 1894, 52.

Cinchotenine.—Z. H. Skraup gives a preliminary notice. Quinine, quinidine, cinchonine and cinchonidine are known to yield "tenines" and

formic acid when cautiously oxidized with permanganate; cinchonine, $C_{19}H_{22}N_2O$, for example, yields cinchotenine, $C_{18}H_{20}N_2O_2$. It is also known that they are di-tertiary bases, and that they contain a hydroxyl group. This is now shown to be true of the "tenines" also, in particular of cinchotenine, the ethylic salt of which forms a compound with two molecules of ethylic iodide; this is not decomposed by alkali carbonates. It yields a benzoyl derivative. Further, the "tenines" contain a carboxyl group, for they, as well as their benzoyl derivatives, form metallic salts; they also yield ethylic salts, and acid chlorides. They do not form additive compounds with hydrogen iodide, whereas the alkaloids from which they are derived, do so; it is thus probable that these alkaloids contain an unsaturated (vinyl) group, $CH:CH_2$, as a side chain, and that this group is converted into carboxyl and formic acid when the alkaloids are oxidized to "tenines." Moreover, the bases that occur in the commercial alkaloids, and contain in the molecule 2 atoms of hydrogen more than these (cinchotine, etc.), probably have an ethyl group in place of this vinyl group. Finally it is pointed out that the relation of cincholeupone, $C_9H_{17}NO_2$ (formed by oxidation of cinchotine), aneroquinine, $C_9H_{15}NO_2$ (by oxidation of cinchonine), and cincholeuponic acid, $C_8H_{13}NO_4$, is that of dihydroalkaloïd to alkaloid to "tenine;" for example, of cinchotine: cinchonine, cinchotenine.—Ber. d. Chem. Ges., 1895, 12.

Cinchotine, or Hydrocinchonine.—W. Koenigs and J. Hoerlin.—Cinchotine chloride, $C_{19}H_{23}N_2Cl$, is obtained by treating cinchotine hydrochloride with phosphorus penta-chloride in chloroform solution. It crystallizes well from ether and melts at 85–87° C. Dihydrocinchonine, $C_{19}H_{22}N_2$, is obtained by boiling the preceding compound with alcoholic potash in a reflux apparatus. It crystallizes in beautiful white leaflets, m. p. 145° C., and when heated with aqueous phosphoric acid at 187–180° C., yields cincholeupone and lepidine. The picrate melts at 195° C. It is therefore identical with the dihydrocinchene obtained from commercial cinchonine. Cinchotine, when oxidized with chromic acid solution, yields cincholeupone, which melts and decomposes at 236° C., and yields a hydrochloride, melting at 198–200° C.; and an aurochloride, melting and decomposing at 203° C. The authors were unable to detect cincholeuponic acid amongst the products of oxidation.—Ber. d. Chem. Ges., 1894, 2290.

β-Oxycinchonine.—By the prolonged use of 50 per cent. sulphuric acid on cinchonine, at 120° C., *α*-oxycinchonine and *β*-oxycinchonine are formed. Jungfleisch and Léger describe the latter as occurring in small prismatic needles when crystallized from strong alcohol. These are colorless, anhydrous, and strongly dextrogyre, melt at 273° C., but at about 250° C. become slightly colored. The compound is almost insoluble in water, but soluble in cold alcohol and very soluble in warm. It is an energetic base,

and its formula is $C_{38}H_{22}N_2O_4$. It forms two classes of salts with monobasic acids—$C_{38}H_{22}N_2O_4$,A, and $C_{38}H_{22}N_2O_4$,2A. Most of the salts are distinctly crystalline.—Comp. rend., cxix., 1268.

Constitution of Cinchonine.—W. v. Miller and G. Rohde.—When methyl cinchonine and phenylhydrazine are heated together in acetic solution a crystalline hydrazone, $C_{26}H_{30}N_4$, is formed, which melts at 151.5° C. It is basic in properties, and dissolves in acids. Ethylcinchonine, methylquinine, and methylquinidine behave similarly.—Ber. d. Chem. Ges., 1894, 1187.

Action of Water on Trihydriodocinchonine.—G. Pum has previously shown that trihydriodocinchonine is converted by alcoholic potash into cinchonine and isocinchonine, and by silver nitrate into β-cinchonine and isocinchonine, whilst Lippmann and Fleissner, by heating the same compound with water at 150–160° C. in a sealed tube, obtained cinchonine, isocinchonine, and a new base, allocinchonine. The author has therefore examined the action of water at the ordinary pressure on trihydriodocinchonine, and finds that it is slowly but completely decomposed with formation of cinchonine and isocinchonine as the sole products. He has also repeated the experiments of Lippmann and Fleissner, but, in this case, also, was unable to obtain any allocinchonine. This difference in the results may possibly be due to the presence of the allocinchonine as an impurity in the original cinchonine employed by Lippmann and Fleissner, or to some slight variation in the conditions under which the reaction was carried out.—Monatsh. f. Chem., 1894, 446.

Detection of Sulphate of Cinchonine in Quinine Sulphate.—E. H. Graue suggests the following modification of de Vrij's process: 1 Gm. of the suspected quinine is dissolved, by the acid of heat, in 40 Cc. of distilled water. To the hot solution add 60 Gm. of a decinormal solution of potassium chromate, K_2CrO_4 (5 Gm. in 95 Cc. distilled water). This at once precipitates the greater part of the quinine, and the entire quinine content will finally precipitate, if the flask be allowed to stand over night at a temperature not higher than 15° C. Filter off the liquid over powdered glass, and add to the filtrate 9 or 10 drops of a solution of 5 Gm. of sodium acetate c. p. in 95 Cc. distilled water. If the quinine sulphate is free from cinchonidine sulphate, the mixture will remain perfectly limpid, and will continue in this condition for several days; but if cinchonidine sulphate be present, even in the smallest quantity, turbidity will ensue, and finally all of that substance will be precipitated. It is only necessary to wash and dry the precipitate, and weigh the same, in order to get the exact amount of the adulterating material.—Oesterr. Zeit. f., Pharm.; Nat. Drug., 1894, 251.

Tests for Quinine.—T. G. Wormley reviews the application of the following tests: (1) Thalleioquin test; (2) Herapathite test; (3) Fluor-

escence and (4) Test of Taste. The thalleioquin test is one of the most characteristic and at the same time one of the most delicate tests. The fluorescence of its crystals is one of the most striking properties, and at the same time the most delicate reaction of quinine at present known. This fluorescence is prevented by chlorides, bromides and iodides, and the free acids of these salts.—Amer. Jour. Pharm., 1894, 561.

Quinine Solvents.—The inconvenience and possible objection to adding sulphuric acid to quinine sulphate, for use in aqueous solution, is noted by Crousel in L'Union Pharmaceutique, 1894, who has found a substitute for the acid in tartaric and citric acids, which are already used for preparing solutions of mercuric chloride for subcutaneous injection. These acids agree better with the digestive fluids; they are, besides, habitually ingested in the form of fermented beverages (wine, cider). They thus constitute eligible solvents of quinine salts, and even of most other alkaloids that are but little or not at all soluble in neutral liquids; and they will be of special advantage, it is maintained, in hypodermatic injections, owing to their very feeble action on the constituents of the blood. The proportions necessary to render 0.5 Gm. of quinine sulphate soluble in 60 Gm. of distilled water are: tartaric acid, 10 Cgm.; citric acid, 30 Cgm.

Quinine Salt for Hypodermic Use.—Marty (Jour. Pharm. Chim., 1894, 49 and 190) considers the basic hydrochlorate the best salt for hypodermic use. He comments upon the objections to the use of other salts, saying that many are unavailable owing to their low solubility in water; to the lactate salt that the objection is made that it is not constant in composition; the sulphovinate is decomposed in the presence of water, and the chlorhydro-sulphate which has been highly recommended for hypodermic use, is acid in reaction and not a true chemical compound. The neutral hydrochlorate contains the highest percentage of alkaloid, and is fairly soluble in water; antipyrine increases its solubility in water, and the addition of this substance is advised. Marty prepares his solution after the following formula:

Quinine hydrochlorate	3 Gm.
Antipyrine	2 Gm.
Distilled water	6 Gm.

Solution is effected by heat. Each Cc. of the solution contains 30 Cgm. of quinine hydrochlorate. This formula is adopted and recommended by the French Comitè technique de Santé de l'Armée.

Microchemical Examination of Quinine.—H. Behrens describes the microchemical reactions of the cinchona alkaloids, quinine, cinchonine, quinidine, and cinchonidine, and describes a method by which small quantities of the last three may be readily detected in commercial samples of quinine. The paper does not admit of being shortly abstracted, and

for the details, reference must, therefore, be made to the original.—Rec. Trav. Chim., 1894, 1; Jour. Chem. Soc., 1894, 491.

Solubility of Quinine in Alkalies.—E. Doumer and E. Deraux find that on pouring a solution of quinine sulphate into an alkaline liquid that the latter dissolved a quantity of quinine. In their experiments with ammonia they find that it is best to use a very small quantity of a very concentrated solution of ammonia in order to have as little loss as possible in precipitating the quinine. The solubility of quinine in potash and soda solutions is greater in proportion as the strength of these solutions is less. They further find that the solubility of quinine in solutions of caustic soda diminishes in proportion as the solution becomes more carbonated. They conclude, therefore, that in order to obtain a most perfect precipitation of quinine by soda, it is best to use an alkaline liquid very much carbonated. Carbonate of ammonia gives entirely different results. The solubility of quinine being greater in the solution of soda to which carbonate of ammonium has been added than in solution of soda alone.—Pharm. Jour. Trans., 1895, 918; Jour. Pharm. Chim., 1895, 50.

Tannate of Quinine.—A. D. Finlay (Bull. Pharm., 1894, 253) employs the following process with good results: Place in a flask of suitable dimensions ten parts of quinine sulphate, two of sodium bicarbonate, and fifty of alcohol. Heat over water-bath or spirit-lamp till brisk effervescence ensues. On cessation of reaction pour the contents of the flask into a funnel, the throat of which is plugged with a little absorbent cotton. Wash the flask with a little alcohol, and mix the filtrates. Dissolve thirty parts of tannic acid in four times its weight of warm alcohol, and filter through absorbent cotton to remove possible impurities. Mix tannin solution while still warm with the solution of quinine. Should coagulation result, agitate and heat gently until the mixture becomes clear. Pour this into one thousand parts of pure cold water, stirring constantly during mixture. Drain in a muslin diaphragm, and wash with another thousand parts of cold water. Express magma; spread on filter-paper resting on a muslin frame, and dry in the air. The resulting product needs no further manipulation. It is an impalpable powder of yellowish-white tint, free from immediate bitterness. Its minute division favors ready absorption; and though the use of alcohol may add to its cost, the superiority of the product will more than compensate for the expense.

Alkylhaloïds of Quinic Acid.—F. Stohr.—Quinic acid methiodide, forms a pale, reddish-brown precipitate, which becomes yellow when dried and powdered; it melts and decomposes at 250° C. The methochloride yields golden-yellow needles melting at 215° C. By treatment with silver nitrate or sulphate, the iodide yields the methonitrate and methosulphate. The ethobromide, and propobromide, and some alkylbetaïnes of quinic acid, are also described.—Chem. Centr., 1894, 428.

Technical Preparation of Cocaïne from Associated Alkaloids.—C. Liebermann anticipates a misconception to which the recent publication of Einhorn and Willstätter under this title, might give rise.—Ber. d. Chem. Ges., 1894, 2051.

Substitution Derivatives of Cocaïne.—A. Einhorn and H. His.—Derivatives of cocaïne, in which the substitution is in the benzoyl-group, may be prepared from ecgonine by converting it into the ether, and then acting on the latter with the anhydride or chloride of a substituted benzoic acid. —Ber. d. Chem. Ges., 1894, 1874.

Cocaine; its Indications and Antidotes.—Manglano (Deutsch. Med. Ztsch.) has arrived at the following conclusions: (1) With correctly adjusted doses and accurate control of effect, cocaine is never contra-indicated for local anæesthesia and ischæmia. (2) As an anodyne, its action is uncertain, and, in heart disease, even dangerous. (3) The indications for the use of cocaine in nervous disturbances are very limited; it is to be forbidden altogether in the presence of cardiac affections. (4) It is also to be strictly avoided for producing a tonic, cardio-vascular effect, because it is to be regarded as a heart poison. (5) Elimination of cocaine from the organism proceeds pretty rapidly during 4–12 hours, while the effect upon the vascular system disappears, according to the dose, in 2 hours. (6) The most prominent and recommendable antidote of cocaine, after the latter has become absorbed, is caffeine, subcutaneously, or internally (less efficient). The dose of the antidote is to be determined by the degree of the toxic symptoms; the antidote never producing disturbances per se, since its influence can always be favorably modified by combining it with sparteine sulphate. The author sometimes applied as much as 3.5 Gm. of caffeine sodio-benzoate (which salt alone he considers certain of absorption by the organism) without observing any injurious phenomenon. (7) Impure cocaine is extremely dangerous to the cardiac function.—Amer. Drug. and Pharm. Rec., 1894.

Cocaine.—Henriques has taken out a patent for the extraction of cocaine, in which the leaves are exhausted with a solution of a zinc salt, and this precipitated with a sulphocyanide, or the leaves may be extracted with a solution of a sulphocyanide and precipitated with a zinc salt. The alkaloid is precipitated as an insoluble double sulphocyanide of cocaine and zinc. In such a case it would be necessary to examine the alkaloid for zinc compounds.—Pharm. Centralh., 1895, 92.

A New Reaction of Colchicine.—Ernest Barillot.—The suspected substance, separated in the state of base, is ground up with 0.25 Gm. oxalic acid and 1 Cc. SO_4H_2. The mixture placed in a small closed tube is kept for an hour in the oil-bath, at 120°. The tube is taken out, the color of the mixture is examined, water is added, and then alcoholic soda in excess. If colchicine is present, the color in the cold is a gold-yellow;

after heating, a deep brown bordering on red, and is not modified by the addition of water. If the aqueous solution is treated with an alkali, then re-acidified with acetic acid, it yields a yellow coloring matter soluble in chloroform. The chloroform leaves it in the state of a yellow powder, which turns to a raspberry-red if moistened with nitric acid of sp. gr. 1.4. —Bull. Soc. Chim., Vols. xi–xii., No. 11; Ber. d. Chem. Ges., 1895, 31.

Conhydrine and Pseudoconhydrine.—C. Engler and A. Kronstein.—When pure pseudoconhydrine (m. p. 101–102°) is dissolved in an excess of boiling light petroleum, and ether added to the solution, a modification separates in large, transparent leaflets. The authors name this modification *b*-pseudoconhydrine, and the other modification (m. p. 101–102°), *a*-pseudoconhydrine. The authors were unable to convert conhydrine into an isomeric modification by heating it with solvents. A negative result was also obtained with *a*-ethylpiperylalkaline.—Ber. d. Chem. Ges., 1894, 1779.

Conium Alkaloids.—R. Wolffenstein. The angle of rotation observed for a specimen of pure coniine being abnormally high (+ 16.4 in a 0.992 decimetre tube at 19°), the base was purified by conversion into the hydrogen tartrate. On treating with potash the filtrate from the crystals of this salt, it yielded a mixture of bases, from which d-coniin was removed in the form of the nitro-derivative; the residual base was n-methyl-coniine. The observed angle of rotation for n-methyl-coniine in a 0.333 decimetre tube is + 22.6°. The author draws attention to some slight confusion which has crept into the literature of this subject.—Ber. d. Chem. Ges., 1894, 2611.

Coniine.—R. Wolffenstein.—An exact description of various well-known d-coniine salts is given in this paper. The crystallographic examination of d-coniine platinochloride reveals the fact that a small quantity of the base was present in Ladenburg's isoconiine; the latter, therefore, has a specific rotatory power lower than that ascribed to it. The picrate of d-coniine crystallizes in small, yellow prisms, and melts at 75°. The aurochloride melts at 77°; the golden-yellow crystals of this salt belong to the rhombic system, and axial ratio being 0.3822 : 1 : 1.2221. The hydrochloride melts at 217.5–218.5°, the hydrobromide at 211°, and the hydriodide at 165°, the cadmioiodide melting at 118°. The acid tartrate melts at 54°. —Ber. d. Chem. Ges., 1894, 2615.

Coniine in Sambucus Nigra.—G. De Sanctis has extracted 50 Kgm. of the leaves and stems of Sambucus nigra with dilute sulphuric acid, then treated it with neutral and basic lead acetate, removed the lead from this solution with H_2SO_4, and precipitated the alkaloid with bismuth iodide and iodide of potassium solution. The precipitate is washed out with water and decomposed with H_2S. The platinum compound has the formula $(C_8H_{17}N.HCl)_2PtCl_4$. He obtained 2.6 Gm. of the pure base. Whether

it is identical with the pure base or only an isomer of the same, has not been determined.—Gazz. Chim. Ital., 1895, xxv, 1, vol. 49; Chem. Zeit. (Rep.), 1895, 81.

Pure Dextrorotatory Coniine.—A. Ladenburg.—Coniine was prepared synthetically in the same way as before, but on a larger scale; 30 Gm. of inactive coniine, boiling at 165–169°, were obtained. This was treated with dextro-rotatory tartaric acid as before, when the salt of dextro-rotatory coniine crystallized out. This was, however, now crystallized three times, after which it yielded a coniine boiling at 167.7° and with sp. gr. = 0.8438 and specific rotation $[a]_D = + 18.3°$, both at 23°. The difference between this and the earlier numbers is attributed to the presence of isoconiine in the sample then investigated.—Ber. d. Chem. Ges., 1894, 3063.

Pure d-Coniine.—By A. Ladenburg (Ber. d. Chem. Ges., 27, 858-859). Pure coniine boils at 166–167° and has a specific rotation equal to $[a]_D = + 15.6°$. This number is identical with that given by Schiff (Ann. der Chem. 166.94), which has been mistaken by Landolt for the angle of rotation and used by him for the calculation of the specific rotation.

The platinochloride of this substance is completely soluble in a mixture of alcohol and ether. When its alcoholic or aqueous solution is evaporated, it solidifies at once on cooling, whereas the platinochloride of the impure material generally remains oily for some time.

r-Coniine.—A Ladenburg.—When 4 Gm. of l-coniine are mixed with 2 Gm. of d-coniine at the ordinary temperature, no change of specific gravity occurs, but there is a fall of temperature. This last must be due to the formation of an endothermic compound, and *r*-coniine is thus a compound, and not a mere mixture, of the two optically active varieties, in spite of the fact that it has the same specific gravity as these. It is, conseqnently, not necessary, as E. Fischer thinks it to be, that a racemic compound should have physical properties different from those of its active components. d- and *r*-coniine have respectively 1.4548 and 1.4581 as their indices of refraction for the D line at 15°, and they dissolve to the extent of 1.80 and 1.93 parts in 100 of water.—Ber. d. Chem. Ges., 1895, 163.

The Products of Hydrolysis of Convolvulin and its Composition.—H. J. Taverne.—Convolvulin, extracted by alcohol from jalap-root coming from Vera Cruz, was hydrolyzed by dissolving it in baryta water, removing the barium with sulphuric acid, and boiling the solution with ½ per cent. of free sulphuric acid. There were formed a volatile acid (methylethylcetic), a crystalline acid (hydroxypentadecylic) not volatile with steam, and a sugar which could not be obtained in the crystalline form, but which the author is nevertheless inclined to regard as glucose. Methylethylacetic acid, CHMeEt.COOH, is identical with the substance obtained by Pagenstecher, except that it is optically active, having specific rotation $[a]_D = + 17° 30'$. Hydroxypentadecylic acid, CHMeEt.CH(OH).

$C_9H_{18}.COOH$, melts at 50.5° when pure; its methylic salt melts at 35°, and boils at 206-208° under 15 m.m. pressure. When it is heated with phosphorus pentachloride and the product reduced with hydrochloric acid and phosphorus, a pentadecylic acid, $C_{15}H_{30}O_2$ is obtained; this melts at 48°, is isomeric, therefore, with the normal acid, which melts at 51°; it boils at 206° under 14 Mm. pressure. When the hydroxy-acid is oxidized with nitric acid, it yields methylethylacetic acid and an acid $C_{10}H_{18}O_4$, which melts at 116° and boils at 235° under 13 Mm., and at 294° under 100 Mm. pressure; this acid is isomeric with sebacic acid, which melts at 133–133.5°. Possibly, convolvulin has the formula $C_{32}H_{62}O_{16}$, and its hydrolysis may then be represented by the equation—

$$C_{32}H_{62}O_{16} + H_2O = 2C_6H_{12}O_6 + C_5H_{10}O_2 + C_{15}H_{30}O_3.$$

—Rec. Trav. Chim. 1894, 187; Jour. Chem. Soc., 1895, 119.

Coniine and its Compounds.—J. Schorm.—In extracting coniine from hemlock seeds, the author recommends, as an improvement on his previously described method, that the crude solution of chlorides should be evaporated to dryness and the residue heated on the sand-bath until the resinous impurities are destroyed and the residue has become odorless. It is then dissolved and filtered, and if the filtrate is colored, should be treated with animal charcoal, or better, with hydrogen peroxide, until colorless, and the solution evaporated to a small bulk; coniine hydrobromide crystallizes out, whilst the mother liquor contains conhydrine and a new base. To obtain these the solution is rendered alkaline and the bases extracted with ether, from which extract the conhydrine crystallizes out, leaving the new base (which is under investigation) as an oil. The hydrated coniine (in the form in which it separates from the steam distillate) has a sp. gr. of 0.900 at 12°, and at 100° gives up 20 per cent. of water, passing into the anhydrous base. It is the best form in which to keep the base. The author has prepared many of the salts from the pure base.

The author recommends the use of hydrogen peroxide for purifying natural alkaloids, but it must only be used in neutral solutions of the chlorides, or it is liable to cause loss of the alkaloid.—Zeit. f. Angew. Chem., 1894, 266.

Corydaline.—J. J. Dobbie and A. Lander have continued their investigation, and from their results corydaline appears to be constituted similarly to papaverine, hydrastine and narcotine, with this difference, that the benzene ring is united directly with the quinoline nucleus, instead of through an intervening carbon atom. They have obtained besides several oxidation products.—Jour. Chem. Soc., 1895, 17.

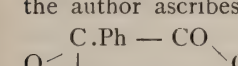
Alkaloids of Corydalis Cava.—J. J. Dobbie and A. Lander, referring to the alkaloid extracted by Freund and Josephi from crude corydaline as

soluble in caustic alkali and with melting point 205–207° C. is probably identical with their corytuberine. The authors (Freund, Josephi in Ann. der. Chem., ccxxvii., 1) show that their alkaloid is quite distinct from corytuberine and is called by them corybulbine. J. J. Dobbie and A. Lander have obtained a quantity of corybulbine and describe it as a fine cryst. powder soluble in alcohol, carbon disulphide, chloroform and hot benzene. It begins to soften at 210° C. but does not melt till heated to 238–240° C. In their first paper on the alkaloids of Corydalis cava, Freund and Josephi gave the formula $C_{34}H_{36}N_2O$, for bulbocapuine, but they have since altered it to $C_{19}H_{19}NO_4$. Although several of the alkaloids mentioned above approach each other very closely in composition, they are easily distinguished by their reactions and by their behavior when treated with hydrogen iodide. Thus, corytuberine alone is soluble in warm water; corybulbin, bulbocapuine and corytuberine are all soluble in sodium hydroxide, whilst corydaline and corycavine are insoluble in both these solvents. The two last mentioned alkaloids are distinguished from one another by the much greater solubility of the former in alcohol. Although there is a larger number of oxygen atoms in corycarine than in any other of these alkaloids, it does not contain any methoxy-groups. Of the remaining alkaloids, all of which contain four oxygen atoms, bulbocapuine has one, corytuberine two, corybulbine three, and corydaline four methoxy-groups. In a note to their paper in the Annalen, Freund and Josephi suggest that corytuberine may be identical with the corydalin-nobiline obtained by Birsmann from corydalis nobilis (Inaug. Disser. Dorpat, 1892.—Jour. Chem. Soc., 1895, 25.

Name.	Formula.	Number of Methoxy Groups.	Melting Point.	Action on Polarized Light.	Solubility in				References.
					Water.	Alcohol.	Chloroform.	Caustic Alkalies.	
1. Corydaline....	$C_{22}H_{29}NO_4$	$C_{18}H_{17}N(OCH_3)_4$	134.5°	Dextro-rotatory.	Insoluble.	Easily soluble.	Easily soluble.	Insoluble	Dobbie & Lander, Pharm. Jour. Trans., 1892, 61, 244 and 605.
2. Corybulbine..	$C_{21}H_{25}NO_4$	$C_{18}H_{16}NO(OCH_3)_3$	238–240°	Do.	Do.	Sparingly soluble in boiling alcohol.	Do.	Soluble.	Dobbie & Lander, Jour. Chem. Soc., 1895, 25.
3. Corytuberine ..	$C_{19}H_{25}NO_4$	$C_{17}H_{19}NO_2(OCH_3)_2$	200°?	Do.	Soluble in hot water.	Soluble.	Insoluble.	Do.	Dobbie & Lander, Pharm. Jour. Trans., 1893, 63, 485.
4. Bulbocapuine..	$C_{19}H_{19}NO_4$	$C_{18}H_{16}NO_3(OCH_3)$	199°	Do.	Insoluble.	Do.	Easily soluble.	Do.	Freund, D. Chem. Ges. Ber., Josephi, 25, 2412; Ann. der Chem., 271, 1.
5. Corycavine....	$C_{23}H_{23}NO_5$	——	214–215°	—?	Do.	Soluble in hot, but only sparingly in cold, alcohol.	—?	Insoluble	

The Crystalline Constituents of Coto Bark.—O. Hesse.—Re-examining his old specimens of cotoïn and cotoïn acetate, the author confirms the formulas $C_{14}H_{12}O_4$ and $C_{14}H_{10}O_4Ac_2$ put forward by Ciamician and Silber. He has also confirmed this molecular weight by Raoult's freezing point method. The author believes that the methoxy-hydroxy-phenylcumarin acetate obtained by Ciamician and Silber when acetylizing cotoïn was due to impurity of their material, as he obtained no such compound. Cotoïn appears to be dimorphous, crystallizing in prisms and plates, both of which yield the same acetate.

The substance previously described by the author and Jobst as dicotoïn appears not to be a single substance. When acetylated, it yields cotoïn acetate. When fused with potash, it yields benzoic acid, the methoxy-hydroxyphenylcumarin of Ciamician and Silber, and a substance to which the author ascribes the name oxymethylphenylcumarin and the formula



This substance crystallizes in long white needles, melts at 221°, and is soluble in alcohol. It does not yield an acetate with acetic anhydrides, neither does hydriodic acid eliminate methyl iodide. The compound, therefore, does not contain either a hydroxy- or methoxy-group. An analogous oxyphenylcumarin melting at 61° and giving no coloration with an alcoholic solution of ferric chloride was also obtained from dicotoïn, by treating it with light petroleum. How these compounds exist in the dicotoïn, whether free or combined, remains undetermined.—Ber. d. Chem. Ges. 1894, 1182.

Microchemical Differentation of Cubebin and Piperin.—All the generally known reagents for cubebin act equally well for piperin. Very recently, however, Mr. Herlant, in investigating black pepper, accidentally discovered a color reagent for piperin, which has no effect on cubebin. In preparing sections of black pepper for microscopical examination, he put them into a concentrated solution of chloral hydrate for the purpose of clearing them. This it did very well, but on placing them under the microscope he found that all the resin cells of the alburnum were colored a lively and well-marked red, which, in the course of 24 hours, deepened into an orange-red, and this became persistent. Testing pure piperin with chloral hydrate, the reaction was at once obtained, but cubebin remained unaltered. The reaction is exceedingly sensitive, and enables one to detect piperin in a number of vegetable substances where its existence was hitherto not suspected.—Nat. Drug., 1895, 80.

Identity of Cytisine and Ulexine.—A. Partheil maintains his claim to priority in proving the identity of these two alkaloids.—Arch. der. Pharm., 1894, 486.

Identity of Sophorine and Cytisine.—P. C. Plugge.—Considerable quantities of sophorine were extracted from *Sophora tomentosa*, and very care-

fully compared with pure cytisine, $C_{11}H_{14}N_2O$, with the result that these two alkaloids proved to be identical. During this investigation, many new characteristics of cytisine were determined, and new derivatives formed. The rotary polarization of cytisine nitrate is $[a]_D = -93.26'$, the coefficient of refraction, 1.34449. Cytisine gives no reaction with strong sulphuric acid, or with that acid and sugar, cerous oxide, or vanadic acid. Fröhde's reagent, and evaporation with phosphoric acid, likewise yield no reaction. Erdmann's reagent causes an orange-yellow coloration; concentrated nitric acid, on warming, a reddish-yellow coloration, which becomes rather darker on the addition of potash; strong sulphuric acid and potassium dichromate, a green coloration; evaporation with hydrochloric acid leaves a yellow residue; calcium hypochlorite gives no coloration. With bromine, cytisine yields an orange-red compound containing 4 atoms of bromine, 2 of which are removed by digesting it with silver nitrate. The compound probably has the formula $C_{11}H_{12}N_2OBr_2,2HBr$. The author claims priority for his pupil, Van de Moer, in establishing the identity of sophorine with cytisine. As both ulexine and sophorine are now proved to be identical with cytisine, this alkaloid has been shown to be present in the various species of *Cytisus*, in *Ulex europæus*, and in *Sophora tomentosa*. Haage and Schmidt failed to find it in *S. japonica*, *S. jap. pendula*, and *S. affinis*, but it is probably present in the poisonous species *S. speciosa* and *S. secundiflora*.—Arch. der. Pharm., 1894, 444.

Bromine on Datiscetin—Action of.—E. Schunck and L. Marchlewski.—When datiscetin is dissolved in glacial acetic acid and treated with a small quantity of bromine, salicylic acid and bromosalicylic acid are formed; if an excess of bromine is used and the liquid is boiled, bromanil separates on cooling, whilst tribromophenol remains dissolved in the mother liquor. That salicylic acid is the initial product in the latter case is proved by the fact that this acid is readily converted into bromanil and tribromophenol when boiled with bromine in glacial acetic acid solution, and it is incidentally mentioned that this is a convenient and rapid method of preparing bromanil.—Ann. der. Chem., 1894, 346.

Activity of Digitalin.—G. Bardet has compared the therapeutic activity of crystallized digitalin with digitoxin, and concludes that the former is the only product obtained from digitalis possessing a really definite, constant, and well known action from a therapeutic point of view. Digitoxin differs both from crystallized and amorphous digitalin, and is described as an indefinite mixture, with variable activity. Amorphous digitalin probably resembles digitoxin in containing a glucosidal body possessing considerable activity, which, however, may vary. It is recommended that crystallized digitalin alone should be prescribed.—Jour. de Pharm. et de Chim., 1895, 27.

Alkaloids of the Fumariaceæ and Papaveraceæ—M. Battandier.—Boc-

conia frutescens yields fumarine identical with that of fumaria, and another alkaloid, which is turned to a peach color on contact with sulphuric acid, and which he proposes to call "boccomine," traces of a third base, having reactions very similar to those of chelidonine, and lastly, abundance of chelerythrine. Fumarine may occasion an error in the toxicological search for strychnine. The glaucine of Probst contains small quantities of fumarine, which gives it the property of taking a violet color in the cold on contact with sulphuric acid.—Compt. rend., 1895, No. 23.

Gaultherin, a New Glucoside from Betula Lenta—A. Schneegans and J. E. Gerock.—In 1844, W. Procter, Jun., announced the existence, in the bark of Betula lenta, of a glucoside, to which he gave the name gaultherin; he did not, however, obtain it in the pure state, and the authors have, therefore, re-examined the Betula lenta bark. In extracting the bark, it was found that even with 94 per cent. alcohol partial hydrolysis of the glucoside took place, the odor of methylic salicylate becoming apparent. By using for extraction a solution of lead acetate (15 per cent. of the weight of the bark) in strong alcohol, this decomposition was prevented. Gaultherin, $C_{14}H_{18}O_8 + H_2O$, crystallizes in colorless needles, which are easily soluble in glacial acetic acid and in alcohol, slowly but freely in water, and almost insoluble in ether, chloroform, benzene and acetone. The aqueous solution does not affect iron salts, nor does it affect Fehling's solution in the cold, but at 100° cuprous oxide is at once precipitated. Strong sulphuric acid dissolves the glucoside, forming a pale-red solution, which rapidly darkens and decomposes. When the dry glucoside is heated, the odor of methylic salicylate becomes apparent at about 100°, and the substance blackens and decomposes at 120°. The aqueous solution has a bitter taste and is levorotatory. The glucoside is decomposed by mineral acids, by alkalies, or by heating the aqueous solution at 130–140°, yielding a carbohydrate and methylic salicylate.—Arch. der Pharm., 1894, 437.

Synthesis of Gentisin.—Kostanecki and Tambor have succeeded in synthesizing a sufficient quantity for identification. *Gentisin* ($C_{14}H_{10}O_5$), the coloring matter of gentian root, loses methyl on boiling with hydriodic acid, forming *gentisein* $C_{13}H_8O_5$, in which three hydroxyl groups are found to be present by acetylation; the parent body, gentisin, only containing two. On methylation *gentisin* gives a monomethyl ether, the same substance being formed by analogously treating *gentisein*, two methyl groups being introduced during the process. In either case the third hydroxyl group can be substituted by acetylation or benzoylation, yielding the same product, whether *gentisin* or *gentisein* be the starting point. On fusion with KOH *gentisein* forms phloroglucol and hydroquinone carbonic acid, whence the constitution of *gentisein* must be that of the trihydroxyxanthone. The reproduction of *gentisein* from these two decomposition products is somewhat difficult, but by carefully working with small quan-

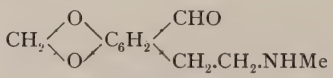
tities at a time, using acetic anhydride, the authors have succeeded in producing a small quantity, and by careful methylation of *gentisein*, have converted it into a monomethyl ether, identical in all respects with gentisin. Monatsh f. Chem. xv., 1.

Hyananchin is a chemically indifferent, crystalline bitter substance found in the seed and seed-hulls of the *Hyananche globosa*. It passes unchanged through the digestive organs of the cat and the dog, and can be extracted from the urine by agitating it with ether. In the pharmacological system hyananchin stands near strychnine but affects the brain rather more than the spinal cord. Hyananche belongs to the Buxaceæ, and a similar poison is discovered in *Buxus sempervirens*.—A. Englehardt, Deutsch. Med. Zeit., 1894, p. 459.

Hydrastine.—E. Schmidt describes the decomposition of hydrastinic acid, and strengthens the evidence in favor of the constitutional formula for hydrastine advocated by Freund, supporting his conclusions by a further study of the methyl derivatives of the alkaloid.—Arch. der Pharm., 1894, 541.

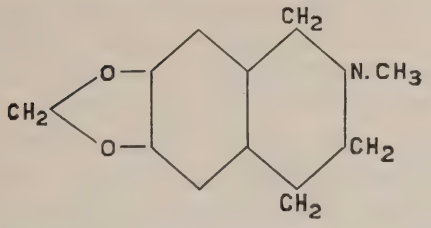
Hydrohydrastinine Hydrochlorate.—Hydrohydrastinine, $C_{11}H_{13}NO_2$, is obtained by the fractionation of hydrastinine. Its hydrochlorate occurs as a fine white powder, easily soluble in water. According to W. Kramm (Merck's Report, March, 1895, 78), hydrohydrastinine accelerates respiration; the latter becomes dyspnoeic, after which clonic reflex spasms, sometimes becoming tetanic, appear. The alkaloid has no effect on the heart's action, and produces successively an increase, decrease, and increase of arterial pressure. The depression of the latter, during exitus lethalis, is secondary, produced only by respiratory disturbance, and can be relieved by artificial respiration. Clinical data are yet wanting.

Hydrastine.—Hydrastine, an alkaloid found in *Hydrastis canadensis*, is one of a group of bases very closely connected with each other, including berberine, narcotine and papaverine. Freund and Schmidt working by different methods determined the constitution of this alkaloid, and showed it to be formed from hydrastinine, $C_{11}H_{13}NO_3$, and opianic acid $[C_6H_2.CHO.(OCH_3)_2.COOH]$ (4, 1, 2, 3), by elimination of the elements of water. Further, it was shown that hydrastinine contains an aldehyde grouping and has the formula—



Hydrastinine.

From hydrastinine, by the elimination of oxygen by reducing agents, hydro-hydrastinine is obtained, which has the formula here given, and is an isoquinoline derivative—



Hydro-hydrastinine.

Fritsch has recently demonstrated the correctness of the above views by the synthesis of hydro-hydrastinine. The synthesis was made by first preparing piperonal-acetalamine by the interaction of piperonal and acetalamine, the equation representing this reaction being:

$$C_6H_4.(CH_2O_2).CHO + NH_2.CH_2.CH.(OEt)_2 =$$
$$C_6H_3.(CH_2O_2).CH:N.CH_2.CH(OEt)_2 + H_2O.$$

The piperonal-acetalamine thus formed is treated with sulphuric acid, when ethyl alcohol is split off and the ring closes, an isoquinoline derivative being formed. This compound is then reduced by a suitable reducing agent, as tin and hydrochloric acid, and a methyl group introduced by treatment with methyl iodide. The identity of the hydro-hydrastinine thus formed with that obtained from hydrastine was proved by comparison of the base and the salts.—Liebig's Annalen, 286, 21; Pharm. Jour. Trans., 1895, 1193.

Helenin.—J. Bredt and W. Posth find that the formula of helenin is $C_{15}H_{20}O_2$; it possesses a neutral reaction, and dissolves in warm alkaline solution, being simultaneously converted into the salt of an oxy-acid. The oxy-acid is completely reconverted into the lactone by heating to the melting point, or partially, by warming with water; if to the latter a mineral acid is added the lactone immediately separates. The authors have also investigated several derivatives of alantolactone of helenin.—Chem. Zeit. (Rep.), 1895, 163.

Hesperidin.—Zenetti finds this glucoside in the unripe orange fruit and the leaves of Barosma betulina and B. crenata.—Pharm. Centralh., 1895, 104.

Derivatives of Humulene.—A. C. Chapman further examines humulene, $C_{15}H_{24}$, a hydrocarbon-sesquiterpene, found in oil of hops. The nitroso-chloride heated with piperidine yields a nitro-piperide, which forms a crystalline hydrochloride and well-defined platinochloride. The nitro-piperide with benzylamine yields a nitro-benzylamine. Humulene treated with nitrous acid, by mixing with sodium nitrite and adding glacial acetic acid, yields a deep blue-colored substance, which soon turns green and from which crystals of a bluish-green color, humulene nitrosite, separate. From the mother liquors, however, colorless crystals were obtained of an

isomeric substance, and it was shown that on boiling the blue compound with alcohol it passes first into the green substance and then the colorless isomer. The difference is probably due to the presence of the groups R.NO and R : N.OH.—Pharm. Jour. Trans., 1895, 1211.

Hygrine and Hygric Acid.—C. T. Lieberman and G. Cybulski.—In addition to the "low-boiling hygrine" and "high-boiling hygrine," a third alkaloid has been isolated from Bolivian cusco leaves, and the name cusk hygrine suggested for it. It is a colorless oily liquid, boils at 185° (32 Mm.), has a sp. gr. of 0.9767 at 17°/17°, and is optically inactive. The base, $C_{13}H_{24}N_2O$, is isolated by means of the crystalline nitrate. The hydrochloride, $C_{13}H_{24}N_2O.2HCl$, and the aurochloride, $C_{13}H_{24}N_2O,2HAuCl_4$, are crystalline; the former is hygroscopic. The platinochloride has also been obtained. "Low-boiling hygrine" boils at 92–94° (20 Mm.) and 111–113° (50 Mm.); sp. gr. = 0.935 at 17°/4°; $[a]_D = -1.3°$. Hygric acid melts at 164° C., but retains water of crystallization even when deposited from alcohol, hence the lower melting points previously observed. When the anhydrous acid is heated slightly above its melting point, carbonic anhydride is copiously evolved, and a mixture of bases is obtained equal to 46 per cent. of the original acid. The constituent of lowest boiling point is n-methylpyrrolidine, which is a strong base and absorbs water and carbonic anhydride from the atmosphere; its vapor, when inhaled, produces violent headache.—Ber. d. Chem. Ges., 1895, 578.

Ilicen.—When the bark of *Ilex aquifolium* is extracted with ether, and the ethereal extract treated with alcoholic potash, a body originally combined with a fatty acid is obtained as one of the products of saponification, which crystallizes from alcohol in colorless needles melting at 182° to 183° C. This body is an alcohol hitherto undescribed. It is slightly soluble in alcohol (1.8 per cent.) and insoluble in water. In a vacuum it sublimes partially. (According to German reports its composition is described as $C_{35}H_{60}$, but we presume this is meant for $C_{35}H_{60}O$, as the body is an alcohol.) With acetic anhydride or propionic anhydride, a diacetyl, and dipropionyl derivative are obtained. No benzoyl compound could be obtained. The diacetyl derivative melts at 219.5°C. The further properties of the body are being studied.—Schneegans and Brounert, in Arch. der Pharm., 1894, 532.

Indigotin in Indigo.—Estimation of.—E. Donath & R. Strasser.—After reviewing the chief methods in use for the estimation of indigotin, the authors finally recommend the following process: 1 Gm. of the powdered sample is mixed with four times its bulk of ignited pumice-stone and exhausted in a Soxhlet-Szombathy extraction apparatus, first with warm, dilute hydrochloric acid, and then with a mixture of four parts of alcohol and one part of ether to remove indigo-gluten and indigo-red. The residue is then extracted with about 30 Cc. of strong sulphuric acid for about

two hours at 80°, the apparatus being suspended inside an air bath. The solution is diluted with water to 1 litre, and 100 Cc. is diluted with 400 Cc. of water and titrated with potassium permanganate which has been carefully checked with pure indigotin under exactly the same conditions. —Zeit. f. Angew. Chem., 1894, 11.

The Alkaloids of Ipecacuanha.—In Merck's Bericht (1894), it is announced that the manufacture of the alkaloids of ipecacuanha, described by Paul and Cownley (Pharm. Jour. Trans., 1894, 396), has been undertaken by that firm, and that they are now prepared to supply both of the pure alkaloids, emetine and cephæline, or their salts, as well as the mixed alkaloid of ipecacuanha, which has hitherto been known by the name of "emetine." In the account given of these alkaloids in the Bericht, it is stated, as the result of experimental trial, that the view put forward by Kunz-Krause in opposition to Paul and Cownley could not be adopted, but that the statements of Paul and Cownley were fully confirmed in all essential particulars. In connection with this subject it is stated in the Pharm. Jour. Trans., 1895, that Paul and Cownley have isolatated a third ipecacuanha alkaloid, and they have succeeded in arriving at some knowledge of its general characters. It exists in very small amount in the root, and has been obtained by shaking the ammoniacal liquor—from which emetine and cephæline have been separated—with chloroform, in which the alkaloid is very soluble. Ether dissolves this alkaloid very sparingly, but by evaporation of the ether solution the alkaloid has been obtained in transparent rhombic prisms, of a pale lemon-yellow color, which rapidly darken when exposed to light. The alcohol solution darkens much more rapidly. The very small quantity of this alkaloid obtained was insufficient for full examination, but it appears to have a higher molecular weight than emetine or cephæline, and a melting point of about 138° C. It is distinctly alkaline, neutralizes acids, and forms salts which appear to be uncrystallizable. Solutions of the salts and of the free alkaloids appear to undergo rapid alteration under the influence of light, with production of dark yellow brown colored substances. In this respect the newly isolated alkaloid presents a marked contrast to the emetine and cephæline, salts of which are unaffected by light, though the alkaloids very soon acquire a yellow color when exposed to light.

New Color Reaction of Iridol—E. Michel.—When a solution of iridol in aqueous alcohol is warmed with a solution of mercuric chloride (2 parts), and sodium nitrite (1 part) in water (40 parts), a beautiful violet coloration, having a bluish tinge, is developed. This reaction was previously described by the author as characteristic of vanillin, and indeed there is no essential difference between the colorations produced by the two substances.—Chem. Zeit., 1894, 53.

Jalapin.—T. Poleck replies to the strictures of Spirgatis on his previous work on Jalapin.—Arch. der. Pharm., 1894, 315.

A New Decomposition Product of Keratin.—S. G. Hedin.—By methods similar to those employed by Drechsel in the preparation of lysine and lysatinine, a new base of the formula $C_6H_{14}N_4O_2$ was obtained from horny substances; it has the same formula, and is probably identical with arginine, prepared by Schulze and Steiger from etiolated lupin seedlings. —Zeit. f. physiol. Chem., 1894, 186.

Lævo-Glucosan. — The glucoside picein (see Piceine) yields, on hydrolysis, an alcoholic compound, piceol, and a glucose. This latter has been examined—it occurs as an anhydride—and Tanret, the discoverer, declares it is not identical with the ordinary glucosan. Its formula has been carefully determined, and is $C_6H_{10}O_5$. The crystals have a sweet taste, and melt at 179°. The rotation is $[a]_D = -66°$ in a 10 per cent. solution. Various compounds of it have been prepared, and the chemistry is being carefully studied.—Jour. Pharm. Chim., 1894, 108.

Alkaloids of Lupinus Albus.—During the past 12 months Soldiani has been engaged in preparing several new compounds of the alkaloids of this plant. There are two isomeric alkaloids present—one a liquid, the other a solid melting at 100° C. He has prepared the acid sulphate of both of these, of the composition $C_{15}H_{24}N_2O,H_2SO_4 + H_2O$. In the case of the liquid alkaloid, he prepares the pure base from the hydrochlorate, adds exactly the quantity of dilute H_2SO_4 required to neutralize, and then adds a further equal quantity. After a time of standing in the dessicator over H_2SO_4, crystals begin to separate out, which are soluble in alcohol. If ether be added to the alcoholic solution, they are obtained transparent; they melt at 178°–179° C. In the case of the solid crystalline alkaloid, a similar process was adopted, and the acid sulphate of identical composition was found to melt at 150° C. with decomposition, but if quickly cooled, the melting point rose to 185° C. The neutral sulphates were prepared of the formula $(C_{15}H_{24}N_2O)_2H_2SO_4$. The salt of the liquid base melts at 82°–83° C. whilst no crystalline compound could be obtained from the solid base. The acid tartrates, $C_{15}H_{24}N_2O,C_4H_6O_6$, were next examined, and the salt of the liquid alkaloid found to melt at 192°–193° C. and to crystallize with three molecules of water. The salt of the isomeric base melts with decomposition at 184°–185° C. Iodine compounds of the formula $C_{15}H_{24}N_2OI_3$ were also prepared. The compound of the liquid base is very insoluble in cold acetic acid, and only very slightly soluble in hot acetic acid. When dry it forms a chocolate colored powder, melting at 196°–197° C. The iodine compound of the isomeric base has not been described.—L'Orosi, xvii, 253.

Melanthin.—W. Schulz reports upon the physiological action of the body melanthin isolated by Greenish from the seeds of *Nigella sativa.* This substance has been shown by Kobert to resemble the sapotoxin of quillaja bark, and by Schulz to be a member of the homologous series of

saponins of the formula $C_nH_{2n-8}O_{10}$. The experiments made showed that melanthin exhibited the typical physiological action of the most poisonous saponins (sapotoxin, cyclamin); the lethal dose for cats was determined to be about two Mgm. per kilogm.—Pharm. Zeit. f. Russ., xxxiii, 51; Pharm. Jour. Trans., 1895, 642.

Mydriatic Bases.—E. Schmidt (Pharm. Centralh., 1894, 600). Acetyl chloride has no action upon either atropine or hyoscyamine, nor has acetic anhydride or sodium acetate any acetylizing action, but by the latter reagents both alkaloids are decomposed to apoatropine which is identical with the apoatropine of other sources. Scopolamine does not behave in this manner, but is changed to an apo-derivative by the action of concentrated H_2SO_4. Upon a study of the decomposition product of scopolamine scopoline, which is a tertiary base, it is found that the same, upon careful oxidation with barium permanganate, is changed to a secondary product $C_7H_{11}NO_2$, scopologenin. These bases are related to each other as tropin and tropigenin, as follows:

$C_7H_{12}ON.CH_3$	$C_7H_{10}O_2N.CH_3$
Tropin.	Scopolin.
$C_7H_{12}ONH$	$C_7H_{10}O_2NH$
Triopigenin.	Scopoligenin.

Scopoline contains (according to Hesse) but one OH group. With hydroxylamine it does not yield an oxime. Neither could a phenylhydrazin compound be obtained.

Mydriatic Alkaloids.—T. G. Wormley (Amer. Jour. Pharm., 1894, 513) has made some comparative examinations of some of the tests for atropine, hyoscyamine and hyoscine.

Vitalis' Test.—On comparing the three alkaloids, in equal but varying quantities, side by side, under this test, no appreciable difference was observed in the results. It has been stated by some writers that under this test atropine yields a yellow coloration, whereas hyoscyamine yields a purple color; but this difference did not exist in the preparations examined.

Auric Chloride Test.—This reagent throws down from aqueous solutions of salts of the alkaloids, even when quite dilute, a bright yellow precipitate of the aurochloride of the alkaloid. The precipitate from the hyoscine, being the least soluble of these gold salts, is notably greater in quantity, and it more promptly assumes the crystalline form than the precipitate from like solutions of either of the other two alkaloids.

If a drop of a 1-100th solution of the alkaloids be treated with a drop of the reagent, the hyoscine solution yields a very copious precipitate and soon the mixture becomes a solid, confused crystalline mass. The precipitate from atropine stands next in quantity, that from hyoscyamine being least. No marked difference was observed in the color of the precipitates, even on spontaneous evaporation to dryness.

A drop of 1-1oooth solution of the alkaloids gave with the reagent, very uniformly in the case of hyoscine, a precipitate which quickly formed crystalline laminæ or leaves; while that from atropine formed minute granules, and that from hyoscyamine crystalline blocks or masses.

Bromine Test.—A solution of bromine in bromohydric acid throws down from solutions of atropine and of hyoscyamine, even when highly dilute, a yellow amorphous precipitate, which is soon converted into characteristic crystals, no marked difference being observed between the reaction of the two alkaloids. With an aqueous solution of hyoscine, the reagent produces a voluminous yellow precipitate which soon becomes converted into minute globules; these change to large yellow drops, which slowly dissolve to a colorless solution. In no instance were crystals obtained by the reagent from a 1-1ooth or more dilute solution of this alkaloid.

This reaction, therefore, serves to discriminate atropine and hyoscyamine from hyoscine, at least from the preparation under examination.

The bromine reagent may be very satisfactorily applied to atropine and hyoscyamine, and their salts, in the solid state. If a minute portion of either alkaloid be touched with a small drop of the reagent, it is immediately converted into a mass of crystals, consisting of rough needles, twig-like masses and bright yellow plates.

The residue from one drop of a 1-1oooth solution of the alkaloids yields with the reagent a mass of crystals of the usual forms; and the residue from a drop of a 1-1ooooth solution gives a very satisfactory deposit of crystalline needles and granules.

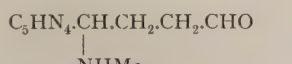
This reaction, as in the case of solutions of the alkaloid, will manifest itself in the presence of comparatively large proportions of foreign matter. Thus, if a drop of a 1-1oooth solution of the alkaloid be treated with a drop of ordinary urine, and the mixture evaporated to dryness, the residue will yield, under the reagent, a very satisfactory crystalline reaction, although the proportion of urine solids to the alkaloid present is about 60: 1. Crystals may be obtained from even a much less quantity of the alkaloid mixed with amount of urine solids. If the bromine reagent be applied to a minute drop of the syrupy solution of hyoscine, it is immediately converted into a mass of reddish-yellow globules, which soon change to bold groups of faintly yellow crystals, these being quite different in form from the crystals obtained from the other two alkaloids.

The residue from a drop of a 1-1ooth solution of hyoscine yields, under the reagent, a mass of yellow globules, which soon become converted into groups of bold crystals. From the residue from a 1-1oooth solution of this alkaloid no crystals were obtained, the precipitate consisting alone of oily drops.

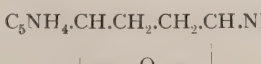
Picric Acid Test.—A drop of a 1-1ooth solution of atropine, when treated with a drop of an alcoholic solution of this reagent, yields a volu-

minous yellow precipitate, which slowly becomes converted into minute yellow drops. If, however, the mixture be stirred with a glass rod, it quickly yields beautiful groups of yellow crystals. A drop of a similar solution of hyoscyamine yields, with the reagent, results not to be distinguished from those from atropine. A like solution of hyoscine gives, with the reagent, a yellow precipitate, which remains amorphous; but on stirring the mixture, it slowly becomes, on standing, a dense mass of fine, feathery or plumose crystals, markedly different in form from the crystals of the preceding alkaloids. These crystals are less readily formed than those from either atropine or hyoscyamine.

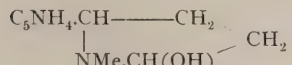
Nicotine.—A. Pinner.—The following formulas are assigned to the substances described in this and previous papers. Brühl finds that those given for nicotine and metanicotine are in harmony with the optical constants of these substances as determined by him:



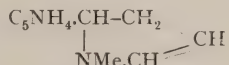
Aldehyde (Oxynicotine.)



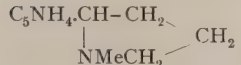
Nicotone.



Nicotol (pseudonicotine oxide).



Dehydronicotine.



Nicotine.

Metanicotine.

—Ber. d. Chem. Ges., 1895, 456.

Nicotine (*Metanicotine*)—A. Pinner.—The substance prepared by Étard, and considered by him to be benzoylnicotine, is really a benzoyl-derivative of a secondary base isomeric with nicotine, which the author terms metanicotine. The derivative is hence benzoylmetanicotine.—Ber. d. Chem. Ges., 1824, 1053.

Salts of Nicotine.—Parenty and Grasset, in a paper on the manufacture and physiological properties of the oxalate and other salts of nicotine, show that while the fatal dose of pure nicotine is from 20 to 21 Mg. per Kg. of animal, that of combined nicotine is 70 Mg., while that of the quadroxalate may be as much as 150 Mg. per Kg. The physiological effects of the latter illustrate, in a minor degree, the same general character as pure nicotine—contraction of the pupils, paralysis and convulsions, salivation, etc.; but it was proved by experiments that animals could become accustomed to take larger quantities daily than the normal fatal dose.—Comp. rend., cxix., 1273, through Pharm. Jour. Trans.

Œnanthotoxine is the name given by Pohl to a resinous substance obtained from *Œnanthe crocata*, of the formula $C_{17}H_{22}O_3$. It is said to be

very poisonous, and produce violent spasms, similarly to picrotoxin. Cicutoxine, obtained by Pohl from Cicuta virosa, is perhaps identical with œnanthotoxine. Therapeutical data are yet wanting.—Merck's Mark. Rep., 1894.

Reactions of Opium Alkaloids.—G. Bruylants has obtained the following results (Annal. der Pharm., 1895; Pharm. Centralh., 1895, 284):

Alkaloids.	I. Fröhde's Reagent with H_2SO_4 before warming.	II. I. After warming.	III. II. After the addition of a grain of $NaNO_3$.
Morphine	lilac color.	green color.	green changes to red, then becomes fainter and finally disappears.
Apomorphine ..	greenish-blue color.	the same.	the same.
Oxymorphine ..	blue color.	the same.	violet changing to red.
Codeine	dirty green then blue.	the same.	as in morphine.
Narceine	blue, then green changing to blue.	dirty green.	the same.
Narcotine	green then greenish-blue.	green.	violet then red.
Papaverine	green to blue, then red.	green to blue, then red.	green which disappears.
Mekonine	green very transient.	dirty blue.	the same.
Cryptopine	dirty green, then greenish-brown.	dark green.	the same.

New Reactions for Morphine.—M. Bruylants modifies Fröhde's test, and combines with it the test of Huseman in the following manner: A portion of the alkaloidal residue is dissolved in sulphuric acid in a watch glass; a little of this solution is placed on the surface of a white tile and a trace of Fröhde's reagent containing 1 Cgm. of molybdate in each cubic Cm. of acid is added, when the well-known lilac tint is produced. Then the watch glass and its contents are warmed on the water bath, another portion is taken up and treated while warm with the same reagent. In the warm solution, a fine green color is obtained. This

established, a minute particle of nitre is dropped into the green solution, when the tint immediately changes from green to red, slowly fading and becoming yellowish. The author enumerates experiments with the other opium alkaloids, which give marked colors when tested by the same successive tests, but which, however, are quite distinct from those obtained in this manner from morphine. Further, on adding a trace of solution of iodic acid to a warm solution of morphine in sulphuric acid, a lilac tint, passing slowly to red, is obtained; with more of the reagent a red color is immediately produced.—Jour. Pharm. Chim., 1895, 444.

A Reagent for Morphine.—Lamol (Med. Week., 1894, 273) recommends uranium acetate as a reagent for the detection of morphine, 0.05 Gm. of morphine giving a distinct reaction. This reagent strikes a red-brown color with a solution of morphine, disappearing on addition of an acid. The addition of a small amount of caustic alkali causes an intense red-colored precipitate, while a large excess gives rise to a yellow precipitate. A few drops of the solution to be examined for morphine is placed in a porcelain capsule, to this is added an aqueous solution which contains 0.3 per cent. of uranium acetate and 0.2 per cent. of sodium acetate, then evaporated to dryness. The presence of morphine will be shown in the brown to bright yellow colored rings in the residue, while other alkaloids leave white or pale yellow rings.—Rep. de Pharm., 1894, 634.

Morphine.—L. Knorr.—It has been previously shown that methylmorphimethine, on treatment with acetic anhydride, is resolved into methoxyhydroxyphenanthrene, and hydroxyethldiethylamine, the amorphous base which is also formed, proves to be optically isomeric with methylmorphimethine, and is termed the β-form. It differs from α-methylmorphimethine (m. p. 118.5°) as follows: It is more readily soluble in ether, the specific refractive power $[a_D]^{17} = +437.3$ (C = 3.746), with sulphuric acid it gives a violet coloration, changing successively to blue and green on dilution; the lethal dose is twice as great. The hydrochloride and tartrate are readily soluble; the methiodide crystallizes in needles, melts at 297°, and was previously obtained by Hesse, who, however, overlooked its optical relationship to the a-derivative; the specific rotatory power $[a_D]^{17} = +227.45$ (C = 1.248). The acetyl derivative and its methiodide are not crystalline. Methylmorphimethine is completely decomposed by hydrochloric acid, but, by the action of hydrogen chloride at 180°, it is resolved into dihydroxyphenanthrene, methylic chloride, water, and probably chlorethyldiethylamine; part of the base is recovered as β-methylmorphimethine. The dihydroxyphenanthrene was identified by its acetyl-derivative (m. p. 158°), and has been previously prepared by von Gerichten and O. Fischer. On distillation with zinc dust, methylmorphimethine yields 10 per cent. of its weight of phenanthrene, whilst from morphine only 3–4 per cent. is formed. These results are in complete accord with the formula

$$OMe.C_{10}H_5 < \begin{matrix} CH:CH \\ CH(OH) \end{matrix} > CH.O.C_2H_4.NMe_2,$$

for methylmorphimethine, previously suggested by the author. Methylmorphimethine is readily prepared by the following method: Sodium (24 Gm.) is dissolved in methylic alcohol (1 litre), commercial morphine (303 Gm.), and methylic iodide (350 Gm.) added; the yield of codeïne methiodide is 90 per cent. of the theoretical. The iodide (400 Gm.) is dissolved in water (2 litres) and boiled for 10 minutes with 25 per cent. soda (500 Cc.). The yield of pure base is 80 per cent. of the theoretical. Codeïne methiodide decomposes at 270°; its specific refractive power $[a_D]^{17} = -81.9°$; α-and β-methylmorphimethine differ considerably from morphine and codeïne in their physiological action; they lower the blood pressure, reduce the heart's activity, and possess no anæsthetic or soporific action, neither do they cause contraction of the pupil.—Ber. d. Chem. Ges., 1894, 1144.

Paucine is the name of the alkaloid of the pauco nuts, the fruit of the *Pentachethia macrophylla*, a plant indigenous in the Congo Basin. It is described by E. Merck (Bericht ueber das Jahr., 1894), as occurring in yellow leaflets, m. p. 126° C., and insoluble in ether and chloroform. Its formula is $C_{27}H_{39}N_3O_5 + 6\frac{1}{2}H_2O$. It may be recrystallized from hot water, but not without simultaneous decomposition and green coloration; hot alcohol also changes it. Paucine hydrochlorate forms white needles, rather sparingly soluble in cold water, and melting between 245 and 247° C. It turns dark-green with a little ferric-chloride solution; while with auric chloride decomposition takes place with the separation of gold. Its aqueous solution is optically inactive. The platinum salt separates on adding platinum chloride to the aqueous solution, as a brownish-red precipitate, consisting of microscopical crystals, soluble in hot water with decomposition. On desiccation it turns to a canary-yellow, with the loss of water; it bakes at about 170° C., and melts, with decomposition, at 185° C. The picrate crystallizes in garnet red prisms, sparingly soluble in cold water, and decomposing after charring, at 220° C.

Piceine and Piceol—Tanret (Compt. rend., xix., 80) working in a similar way to that by which he effected the preparation of the vincetoxines and aurantiamarin, has isolated several glucosides from the leaves of *Pinus picea*. Of these picein is the most important. Finely chopped up twigs are treated with boiling water, rendered alkaline by the addition of 5 per cent. of the weight of the twigs of sodium bicarbonate. After a short boiling, the mass is allowed to macerate for twenty-four hours. The liquid is then filtered off and precipitated with ammoniacal solution of lead acetate. The precipitate is decomposed with H_2SO_4, and after filtration and exact neutralization with magnesia, to the mixture evaporated to a syrupy consistence, one-third of its weight of $MgSO_4$ is then added, and the whole is extracted with acetic ether. By distilling

off the ether, and extracting with cold alcohol, one or more amorphous glucosides are obtained, while the remainder, on boiling with absolute alcohol, deposits, on cooling, fine crystals of picein. The yield is from .3 to .9 per cent. From water it separates with one molecule of H_2O. Its composition is $C_{14}H_{18}O_7,H_2O$. It crystallizes in prismatic silky needles, soluble in their own weight of boiling water, 1 in 50 at 15° C. It dissolves in 534 parts of cold absolute alcohol, 33 parts of boiling alcohol. It is lævorotatory, $[a]_D = -84°$ and melts at 194° C. Under the influence of emulsin, picein takes up a molecule of water and splits up into glucose and piceol:

$$C_{14}H_{18}O_7+H_2O=C_6H_{12}O_6+C_8H_8O_2$$

Dilute acids produce the same result. The new body, piceol, crystallizes in needles, melting at 109° C., soluble in 112 parts of cold and 15 parts of boiling water. Perchloride of iron gives a violet color with it. It behaves in all respects as a monatomic phenol, and yields esters with organic acids and compounds with metals.

Constitution of Pilocarpine.—A. R. L. Dohme reviews the work on the constitution of pilocarpine by the different experimenters and dwells at some length upon the work done by Hardy and Calmels.—Pharm. Era, 1894, 539.

Synthesis of Piperic Acid and Piperin.—A. Ladenburg and M. Scholtz.—Piperonal does not condense with crotonaldehyde, but with acetaldehyde in presence of alkali it yields piperonalacraldehyde, $CH_2:O_2:C_6H_3.CH:CH.CHO$, which crystallizes in yellow plates, melts at 70°, but boils at 180–190° (20 Mm.), and has a slight aromatic odor. The phenylhydrazone forms yellow crystals, melts at 160°, and turns brown on exposure to light. The anilid crystallizes in pale yellow needles, melting at 118°. Piperic acid is formed by fusing piperonalacraldehyde with anhydrous sodium acetate and acetic anhydride; it is identical with the natural acid. The following salts were prepared from both acids, and were found to agree in properties. The potassium salt crystallizes in lustrous needles; the sodium salt is crystalline; the calcium, barium, and magnesium salts appear as if they were amorphous, but in reality consist of slender microscopic needles; the manganous salt crystallizes in lustrous, yellow plates, the copper salt in slender, blue, stellate needles. The lead salt is amorphous.—Ber. d. Chem. Ges., 1894, 2958.

Piperovatine is the name given by Dunstan and Garnett (Chem. News, lxxi, 33) to a crystalline substance obtained from Piper ovatum, of the formula $C_{16}H_{21}NO_2$. Piper ovatum is a West Indian medicinal plant growing in Trinidad. When chewed it gives rise to a tingling sensation and profuse salivation, accompanied by temporary local anæsthesia. The leaves were found to contain a terpene and a considerable quantity of physiologi-

cally active resin, which is also present in the root and stems. From this resin the authors were ultimately able, by a tedious process, to separate the highly active piperovatine, which appears to possess an alkaloidal structure, but is, nevertheless, devoid of basic properties. It is nearly insoluble in water and in dilute acid and alkalies, but dissolves readily in alcohol, the alcoholic solution exhibiting the curious property of setting to a jelly of very minute crystals when water is added to it. Piperovatine acts as a temporary depressant of both motor and sensory nerves, and also as a heart poison. It produces a powerful stimulant effect on the spinal cord, causing a tonic spasm resembling that of strychnine. It, therefore, seems likely to be of service in therapeutics.

Podophyllotoxin.—Spindler (Lancet, 1894, ii., p. 212).—According to V. Podwissotsky, who has made a careful and exhaustive examination of podophyllum (both root and resin), podophyllotoxin is the natural combination of picropodophyllin with an inactive resin acid existing in may-apple root. It is a yellowish-white, resinous powder, of a very bitter taste and a faintly acid reaction; soluble in alcohol and in hot water, only sparingly soluble in cold water.

Spindler has recently experimented with podophyllotoxin, and finds that in small doses it is an excellent laxative. He prescribes $\frac{1}{6}$ grain (1 Ctg.) in alcoholic solution, which usually results in a normal stool. Sometimes, indeed, a single dose will cause a habitually constipated patient to go to stool regularly every day for a week or more. One great advantage claimed for podophyllotoxin over most other laxatives is, that it does not bind the bowels afterward.

Quassol.—E. Merck describes this substance as separating from quassin by solution in ether. When purified it crystallizes from alcohol in white flakes, which are moderately soluble in ether and chloroform, sparingly so in alcohol, and not at all in water. The crystals melt at 149°–151°, and the optical rotation amounted to $[a]_D = 42.6°$. Quassol is distinguished from quassin by its tastelessness, and is probably represented by the formula $C_{40}H_{70}O$, or $C_{40}H_{70}O + H_2O$.—Bericht, 1894, 18; Pharm. Jour. Trans., 1895, 834.

Reactions of Santonin, Veratrine, and Resorcin.—When small quantities of powdered santonin, veratine, or resorcin are burned, in a little glass saucer, with a few drops of sulphuric acid and alcohol in excess, the following is observed, according to A. Ferraro (Apoth. Ztg., 1894, 815), in the residue: (a) With santonin, the residue shows a uniform and characteristic red; (b) With resorcin, the residue is at first olive-green, but passes quickly into a light blood-red, revealing, besides, characteristic yellow zones; (c) With veratrine, the residue is of a uniform violet-red color. All these colorations are constant. Other substances—as sulphur, carbon, morphine, codeine, antipyrine, antifebrin, strychnine, brucine, sali-

cin, terpin, acacia, and sugar—when subjected to the same treatment, leave residues essentially different in appearance from those of santonin, veratrine, or resorcin. The first seven of these chemicals are said to give a colorless or indistinctly colored residue. Codeine leaves a greenish residue, and salicin a pink one (much less beautiful and characteristic than that obtained by the action of sulphuric acid upon salicin in the cold). Salicin, which turns to an ochre color in the cold with sulphuric acid, leaves, on burning with sulphuric acid and alcohol, a reddish residue, which, on contact with water, assumes a yellowish coloration. Brucine, which is colored by sulphuric acid in the cold, leaves, if burnt as above mentioned, a residue of a faintly yellow color. This method might be specially valuable for testing santonin. Neither boric acid, sodium chloride, nor magnesium sulphate, when admixed to santonin, destroys the characteristic color-reaction of the santonin. The same is the case with sulphur, terpin, salicin, antipyrine, and antifebrin. On the other hand, sugar and acacia, which are not infrequently used for adulterating santonin, conceal the reaction completely, since they produce first a reddish-brown coloration, and afterward a black one in consequence of carbonization. Nitric acid or saltpetre, admixed to the residue of combustion of santonin, darkens the coloration a little. The addition of potassium chlorate to the sulphuric acid does not influence the reaction, nor does the addition of chlorine water and ammonia. The above-described reactions are therefore characteristic of santonin, veratrine, and resorcin, respectively. That of santonin is important, inasmuch as with its aid adulteration with acacia, sugar, and substances of similar composition can promptly and easily be detected.

Scopoline Compounds.—When scopoline is melted at 230° with salicylid, a reddish yellow varnish is obtained, which is extracted with hydrochloric acid; the extract is rendered alkaline with potash and extracted with chloroform. A base is thus extracted which crystallizes from alcohol in water free, white needles melting at 105° C. This base is salicyl-scopoleine, but does not appear to possess any mydriatic properties. The hydrochloride occurs in white crystals containing 11.4 per cent. of HCl. The hydrobromide and sulphate have also been prepared. The gold salt was obtained in a crystalline condition. It melted at 195° C. (uncorrected), and contained 31.85 per cent. of gold. The platinum salt was also prepared, and these all corresponded to the formula $C_{15}H_{17}NO_4$. By acting on the original alkaloid with benzoyl or acetyl chloride, benzoyl and acetyl-scopoleine can be obtained.—Apoth. Zeit., 1894.

Scopolamine.— Raehlmann recommends this as being free from the unpleasant after effects experienced in the use of atropine, the hydrobromate in solution of the strength of 1 to 1000 being employed by opthalmogists. It is claimed that this alkaloid is in every respect superior to atropine.—Pharm. Centralh., 1894, 34.

Tropyl-scopoleine.—Tropic acid is heated with acetic anhydride, and the resulting tropic anhydride is heated with scopoleine to 230° C. The resulting brown mass is extracted with weak hydrochloric acid, and an alkaloid is obtained from this which forms an amorphous white powder, melting at 166°. Various salts have been prepared and the gold and platinum compounds also. Its formula is $C_{17}H_{22}NO_4$, and is isomeric with natural scopolamine.—Apoth. Zeit., 1894.

Scopolamine.—E. Schmidt.—In a former communication the author showed that the so-called commercial hyoscine preparations consisted chiefly of a base of the formula, $C_{17}H_{21}NO_4$, to which he gave the name scopolamine. As Ladenburg called this work in question, the author has again examined samples of commercial hyoscine bromide and hyoscine iodide, but in all cases has found them to consist mainly of the corresponding scopolamine salt, together with traces of salts of atropine and hyoscyamine, and of another alkaloid present in too minute traces for characterization. The author has also investigated large quantities of hyoscyamine seeds. Considerable quantities of scopolamine and hyoscyamine and small quantities of atropine were obtained from these seeds, but no hyoscine conld be detected. He therefore considers the existence of hyoscine, $C_{17}H_{23}NO_3$, to be doubtful, although not yet fully disproved. Scopolamine picrate crystallizes in yellow needles, melting at 187–188°, and soluble in boiling water. The methiodide forms colorless prisms melting at 215°, and easily soluble in water and boiling alcohol. A number of other salts are also described. Acetyl chloride is without action on either hyoscyamine or atropine, but benzoyl chloride reacts with both these alkaloids. With atropine it yields benzoylatropine; with hyoscyamine, according to the conditions of experiment, benzoylhyoscyamine or benzoylatropine. Benzoylhyoscyamine aurochloride, $C_{17}H_{23}BzNO_3.HAuCl_4$, is a yellow amorphous mass, melting at 70°; the corresponding platinochloride melts at 164–170°. Benzoylatropine aurochloride, $C_{17}H_{22}BzNO_3,HAuCl_4$, is a yellow amorphous and gummy mass, melting at 125–135°. The corresponding platinochloride melts at 215°. When hyoscyamine or atropine is heated with acetic anhydride and a little sodium acetate, no acetylization occurs, but both the alkaloids are converted, by the abstraction of the elements of water, into apoatropine. Under like conditions scopolamine appears to be partly acetylated, partly converted into an apoderivative, but the products could not be fully isolated. When an aqueous solution of scopolamine hydrobromide is treated with moist silver oxide, it is in part converted into an almost inactive scopolamine, which crystallizes more easily than the ordinary scopolamine, in needles melting at 55–56°, and yields an aurochloride closely resembling that of the ordinary alkaloid. The hydrobromide is much more readily crystallizable than that of the normal alkaloid, and forms colorless, crystalline aggregates, showing a rotation $[a]_D = +0.44°$, as compared with $[a]_D = -25°43'$ for normal scopo-

lamine hydrobromide. This inactive scopolamine is still under investigation. Scopolamine, which is now being investigated, is a tertiary base, which is oxidized by barium permanganate to a secondary base, $C_7H_{11}NO_2$, the latter yields a crystalline nitroso-derivative, but is reconverted into scopoline by the action of methylic iodide.—Arch. der Pharm., 1894, 409.

Extension of the Solanaceous Alkaloids.—Ph. Molle has found by the use of microchemical reagents that a number of the solanaceæ, like *Nicandra physaloides*, *Physalis alkekengi*, *Petunia violacea*, *Salpiglossis sinuata* and *Brunfelsia americana*, possess the alkaloids in the resin of the vegetation point of the stem. In stems that were washed, it was observed upon the epidermal layer and upon the walls of the tissues of the fibro-vascular bundles. In the leaf, these alkaloids are located in the epidermis and sieve tubes. In the roots they are located in the cap, epidermis and outside layer of the periblem. In old roots the alkaloids are found in the cortex and young elements of the periderm. In the flowers they are contained in the bud and carpels. They disappear here, however, upon ripening. In the ripe seeds the embryo and the endosperm are free, whereas the seed-covering in some cases contains the alkaloids. Upon the germination of the plant, when the young meristem begins to divide, the alkaloids are apparent.—Bull. Soc. Belge de Micros., 1895, 8; Chem. Zeit. (Rep.), 1895, 106.

Senecionine and Senecine.—A. Grandval and H. Lajoux have operated upon Senecio vulgaris. Senecionine has the composition $C_{18}H_{26}NO_6$. It does not display striking reactions. Senecine is incomparably more bitter than senecionine. Its analysis is not given. With sulphuric acid it gives a yellowish coloration, inclining to brown; with nitric acid, a reddish-violet color and a deep violet precipitate; with sulpho-vanadic acid a violet brown color.—Compt. rend., 1895, No. 20; Chem. News, 1895, 282.

Spasmotin and Sphacelotoxin.—Böhringer and Söhne obtained a yellow amorphous powder, insoluble in water, dilute acids, or petroleum ether, but soluble in alcohol or benzol, and very readily soluble in ether. Its activity was stated to be very great in doses of 4 to 8 Cgm. In a recent report of Messrs. Gehe & Co., reference to this product is made, and the opinion is expressed that apart from the various galenical preparations of ergot, the difference in the chemical product obtained from the drug by chemists are chiefly due to differences in the material operated upon, inasmuch as the varying influence of the conditions of climate, growth, preservation, etc., affect the action of the fungus upon the albuminous constituents of the grain. The greater the degree of moisture of the ergotized grain, and the less carefully it is dried, the more powerful is this action. The fact that Keller found scarcely any ergotinine in ergot that was carefully collected and dried may be thus explicable, as well as the circumstances that some parcels contain only amorphous ergotinine, while

others contain it in a crystallizable condition, some being quite inert, while others are highly poisonous. If the preparation of products from ergot is thus rendered uncertain, still further difficulties arise from their liability to alteration. Thus, for instance, the alcoholic solution of some kinds of ergotinine rapidly turns red, and after some time gives no alkaloid reaction. In the absence of any trustworthy chemical test of identity, physiological experiment is the only means available. Cornutine appears to be a product of the alteration of ergotinine. Sphacelinic acid, again, has only been obtained in the form of a dark-colored resin, and as it is rendered immediately inert by contact with alkalies, all attempts at purification have been fruitless.—Pharm. Jour. Trans., 1894, 251.

Test for Sparteine Sulphate.—G. Marque (Journ. Pharm. Chim., xxx., 555) points out that if a small quantity of sparteine sulphate be mixed with about one-third of its weight of chromic acid and gently heated in a porcelain capsule, the mass will soon turn green, in consequence of the reduction of the chromic acid, and a strong odor of coniine will be emitted.

Test for Strychnine.—W. P. Mason and J. W. Bowman have prepared a table to indicate the relative degree of delicacy of the several reagents employed. The authors found that $KMnO_4$ gave the most satisfactory results.—Jour. Amer. Chem. Soc., 1894, No. 12.

Strychnos Ignatia.—F. Ransonia.—Results show that although the seeds of S. ignatia contain a larger proportion of strychnine as compared with brucine, than those of nux vomica, the percentage of total alkaloids is considerably less.—Chem. and Drug., 1894, 188.

Post-mortem Detection and Estimation of Strychnine.—A. S. Cushman proposes a method as follows: The stomach contents or viscera are digested with water acidulated with acetic acid, filtered and the filtrate evaporated to dryness, alcohol (80 per cent.) added, warmed, filtered and the extraction with alcohol repeated. These extracted liquors are evaporated to dryness, the extract taken up with water and acetic acid and shaken out with acetic ether. Twelve extractions with acetic ether are sometimes necessary. Evaporate the extractions of ether over hot water to dryness. The alkaloid may be detected here, but for quantitative work the residue is dissolved in dilute acetic acid, diluted and extraction made with chloroform-ether (1-1). The chloroform-ether solution is run into a burette which is supported over a small weighed glass dish, which is kept warm on a water-bath, and the liquid allowed to evaporate gently, drop by drop, until a sufficient quantity of pure alkaloid has collected in the centre of the dish to render an accurate weighing possible, or all of the alkaloid may be collected and weighed at once.—Chem. News, 1894, 28; from Trans. Acad. Sci. of St. Louis, vi., No. 17.

Estimation of the Alkaloids in Strychnos Seeds—C. C. Keller.—Fifteen gms. of the powdered substance is freed from fat by washing with ether in

a tube plugged with cotton wool. The ethereal extract, amounting to 100 Cc., contains some alkaloid, which must be recovered by shaking it with 15 Cc. of $\frac{N}{30}$ hydrochloric acid, and washing out the acid with 10 Cc. of water. The exhausted residue is transferred to a vessel of 250 Cc.; ether is added until the whole amount present is 100 Gms., 50 Gms. of chloroform, and 10 Gms. of 10 per cent. ammonia solution are added, and the whole is shaken for half an hour. The acid solution is then added and again well shaken. When separation is complete, the ether chloroform solution is filtered, and 100 Gms. of it is evaporated in a tared conical flask. The residue is freed from chloroform, which it obstinately retains, by repeated evaporation with absolute alcohol, then dried at 95–100° and weighed. The purity of the alkaloid may be verified by titration with iodoeosin as indicator. The proportion of chloroform to ether must be accurately observed. Zeit. f. anal. Chem., 1894, 491.

Thebaïne.—M. Freund.—Thebenine is not isomeric with thebaïne as Hesse thought, but contains hydroxyl in place of methoxyl; its methiodide, $C_{20}H_{24}.NO_3I$, is crystalline, melts at 210° C., and is resolved into trimethylamine and thebenol, $C_{17}H_{14}O$, on fusion with alkalies. Thebenol melts at 186°, and by distillation with zinc dust, or reduction with hydriodic acid and phosphorus, yields a hydrocarbon which melts at 135° C., and is perhaps an ethylphenanthrene. Thebenine ethiodide when fused with alkalies yields thebenol and methyldiethylamine, proving that thebenine is a secondary base. Thebaïne is a tertiary base, but its relationship to thebenine precludes the presence in it of the group NMe_2. When treated with alkalies, its methiodide yields tetramethylethylenediamine, not trimethylamine, as Roser stated; it is probable that dimethylhydroxyethylamine, which is closely related to morphine, is formed as intermediate product. The production of the ethylene base resembles that of tetrethylethylenediamine from triethylaminethylene iodide as observed by Ladenburg. The following provisional formulas are given for thebaïne, thebenine, and thebenol respectively:

$$C_{14}H_8(OMe)_2\begin{cases}NMe.CH_2\\ \quad|\\ O—CH_2\end{cases}; \quad NHMe.C_{14}H_7(OMe)(OH)<\begin{matrix}CH_2\\ O—\end{matrix}>CH_2;$$

$$OMe.C_{14}H_6(OH)<\begin{matrix}CH_2\\ O—\end{matrix}>CH_2.$$

—Ber. d. Chem. Ges., 1894, 2961.

Occurrence of Vanillin.—E. O. Lippmann has separated vanillin from the flowers of Nigritella suaveolens, a variety of orchid; the extract of the plant also contains a substance recalling heliotropin or piperonal in odor. —Ber. d. Chim. Ges., 1894, 3409.

Vellosine and Derivatives.—Hesse discovered two alkaloids in pereira bark (*geissospermum vellosii*), the crystalline geissospermine ($C_{19}H_{24}N_2O_2+H_2O$), and the amorphous pereirine ($C_{19}H_{24}NO_2$), and also observed a

third alkaloid, which, however, was not examined more closely until recently, when Freund and C. Fauvet (Chem. Ztg., xviii., 305) took up the subject. These investigators describe Vellosine as follows: Its formula is $C_{23}H_{28}N_2O_4$; it contains two methoxyl groups, combines only with one equivalent of acid, and seems in many respects to resemble brucine. When boiled with dilute hydrochloric acid, one molecule of water is given off from every two molecules of vellosine, and an amorphous base results, of the formula $C_{46}H_{54}N_4O_7$, and called "apovellosine." This yields well-crystallizing salts with four equivalents of acid. By the action of methyl iodide a body is formed from the base by the addition of two molecules of halogen alkyl. Apovellosine contains four methoxyl groups combined with oxygen and liberated by concentrated hydrobromic acid with the aid of heat. The base arising herefrom is called "apovellosol." When apovellosine is boiled with potassa solution a crystalline compound—$C_{42}H_{54}N_4O_6$, "apovellosidine"—forms, the exact relation of which to the other pereira alkaloids is yet undetermined.—Ann. der Chem., 1894, 247.

Oils (Ethereal).

Estimation of Esters in Essential Oils.—The method employed by Schimmel and Co. (See Semi-Annual Report, Oct., 1894,) is as follows:

To 1 or 2 Gm. of the oil, exactly weighed upon a technical balance in a flask of 100 Cc. capacity, from 10 to 20 Cc. of alcoholic potash are added. The potash employed is preferably of a strength about equivalent to a $\frac{N}{2}$ sulphuric-acid. Before the whole quantity of alkali is added to the oil, a few drops of phenolphthalein are poured in with the object of detecting any appreciable quantity of free acid which may be present. In many cases, e. g. bergamot and lavender oils, the amount of such acid is so small that it may be altogether left out of account. After boiling for one or two hours under a reflux condenser on the water-bath, the saponification is complete and after dilution with water the excess of potash is titrated with $\frac{N}{2}$ sulphuric-acid.

In this way the quantity of potash used in the saponification of the ester present in the oil is ascertained and from it can be reckoned the saponification figure (S. F.) i. e. that number which indicates how many milligrammes KOH are used by 1 Gm. of oil. Reference to the appended table (loc. cit.) will then show the percentage of ester in the oil to which this number corresponds.

Numerous control experiments have shown that with a little practice very good results are obtainable, which seldom vary more than a half to one per cent. among themselves.

If the physical properties of the oils, especially the specific gravity, be simultaneously examined, the usual adulterants, turpentine, spike, cedar and sweet orange oils and alcohol are readily detected.

Essential Oil Industry.—The Oregon Essential Oil Company has been

experimenting for months past with the distillation, products and residues of the Dangears fir, and have succeeded in obtaining a good turpentine, besides different varieties of rosin and pitch. The distillery also produces oil of cedar, oil of hemlock, oil of fir, and oil of peppermint. Several varieties of Mentha abound in Oregon, and the true Mentha piperita is found abundantly in Linn and Polk counties. In fact it was owing to the profuse growth of this herb that the stills were first erected. Farmers are now cultivating the plant, so, together with the native crop, the distillery will be sure of a sufficiency of material.—Pacific Drug. and Phys., 1895, 80.

Bitter Almond Oil.—In order to prevent the decomposition of this oil, it is advisable to keep it in well-corked bottles filled to the neck, or when that is impossible, to add 10 per cent. of alcohol to the oil. The decomposition is due to oxidation of benzaldehyde to benzoic acid; as much as 20.7 per cent. of the latter may be formed during 12 hours.—Schimmel's Rep., April, 1895.

Volatile Oil of Abies Balsamea.—C. G. Hunkel gives the results of a re-determination of the physical constants of the oil distilled from the fresh leaves and a few cones of abies balsamea. Analytical results indicated the presence of a large amount of an oxygenated compound. The specific gravity of the oil was 0.8892, and rotatory power $[a]_D = -32.66°$ (100 Mm. tube), the determination being made at 20° C. The boiling point was unstable, and the first fractions obtained on distillation had an acid reaction, the decomposition of an ester being thus indicated. After saponification of the mixed fractions and distillation of the alkaline liquid with aqueous vapor, oil came over clear at first, but subsequently the distillate crystallized. M. p. of crystals, 198–199° C., in a sealed tube; s. g. of oil, 0.8759, and $[a]_D = -30.22°$. On refractionation this oil congealed in the condensing tube, crystals having a m. p. of 201–202° C. being formed. The fraction of oil distilling at 160–165° C. had sp. gr. 0.8798, and $[a]_D = -30.86°$. It yielded but little pinene nitrosochloride (crystals melting at 101° C.), but from the mother liquor, after freezing for twenty-four hours, three separate crops of crystals were obtained, melting at 134.5° C., 135–136° C., and 136.5°–137.5° C., respectively. The total quantity was too small, however, for further examination. The fraction of oil distilling at 165–168° C., had a more distinctly terebinthinate odor than the preceding one, and had sp. gr. 0.8719, whilst $[a]_D = -31.58°$. The crystals melting at 201–202° C. consisted of large shining plates, and were found to correspond with borneol, the same product being yielded by the fractions distilling at 168–172° C. and 172–185° C. The acid present was proved to be acetic, and it would appear that the oil contains pinene and bornyl acetate, both being lævogyrate.—Am. Jour. Pharm., 1895, 9.

Oil of Ambrosia.—The fresh herb (*Ambrosia artemisiæfolia* L.) yields 0.07 per cent. of oil of a deep green color and an aromatic, not unpleas-

ant odor. Sp. gr., at 15° C., 0.870. Optical rotation in a tube of 100 Mm. —26° 0′. The ambrosia trifida yields no oil.—Schimmel's Report, Oct., 1894.

Angelica Oil.—The oil from the leaves and young buds is of a somewhat different character from the oil of the root. The aromas of the two oils are similar. The specific gravity of the oil from the *herb* at 15° is 0.886, its optical rotation + 20° to 25° in a 100 Mm. tube, whereas the physical constants of the root-oil are: sp. gr. 0.863 to 0.918, opt. rot. + 25° to 31°. The yield of oil from the herb was 0.09 per cent.—Ibid., April, 1895.

Anise Oil.—J. C. Umney suggests that the source should be *Pimpinella anisum* and *Illicium anisatum;* sp. gr. 0.975 to 0.990 at 15° C. Melting point—after solidifying should not melt below 59° F. (15° C.). Distinguishing test—the anise fruit oil affords with saturated solution of hydrochloric gas in absolute alcohol a blue coloration, which is not yielded by staranise oil.—Pharm. Jour. Trans., 1895, 947.

Oil of Bay.—Power and Kleber have examined oil of bay and separated from it eugenol, myrcene—a hitherto unknown terpene, chavicol, methyl-eugenol, methyl-chavicol, phellandrene and citral, the names of the constituents being arranged according to the relative amounts in which they occur. The specific gravity of the oil varies from 0.965 to 0.985 at 15° C., and is commonly above 0.970, and the amount of phenols present ranges between 60 and 65 per cent., being approximately in direct proportion to the specific gravity. The freshly distilled oil forms a perfectly clear solution with alcohol. It is suggested that the fact that the oil contains no pinene in connection with the specific gravity may be utilized for the detection of adulterations with oil of turpentine or other oils containing pinene. If 10 Cc. of a suspected oil be taken and 1 Cc. slowly distilled off in a small fractionating flask, the distillate will contain most of the pinene that may be present. On adding to this liquid, in a test tube, first 1 Cc. of amyl nitrite, then 2 Cc. of glacial acetic acid, and subsequently, while the tube is immersed in a mixture of ice and salt and constantly agitated, a mixture of equal parts of glacial acetic and concentrated hydrochloric acids (drop by drop so long as the liquid has a bluish coloration), the presence of pinene will be indicated by a white crystalline precipitate of pinene nitrosochloride, $C_{10}H_{16}.NO.Cl$. Ten per cent. of oil of turpentine in oil of bay may thus be detected.—Pharm. Runds., 1895, 60.

Bergamot Oil.—J. C. Umney suggests the following: Sp. gr. at 15° C.—.882 to .886. Solubility—In twice its volume of alcohol of 80 per cent. strength by volume. Rotation—Not more than + 15 in 100 Mm. tube. Residue—Not more than 6 per cent. when evaporated in a water bath. Percentage of linalyl acetate—Determined by a recorded process, not less than 38 per cent.—Pharm. Jour. Trans., 1895, 948.

Cajuput Oil.—J. C. Umney suggests the following: Sp. gr.—.922 to .927 at 15° C. Presence of a large proportion of cineol should cause it to become semi-solid on addition of syrupy phosphoric acid 1.750.—Pharm. Jour. Trans., 1895, 948.

Oil of Cananga.—A. Reicher (Bull. Soc. Chem.; Chem. News, 1895, 65). The density of this oil at 21°C. is 0.9058 and the index of refraction n=1.49655. Its laevo rotation $[a]_D = -28.5°$. Its composition is C, 85.68; H, 11.81; O, 2.51. Oil of Cananga has a great resemblance to oil of ylang-ylang, but it is clearly distinguished from the latter by containing a much larger proportion of sesqui-terpene.

Calamus Oil.—All oils of a lower rotatory power than + 10°, as well as such that do not give clear solutions with any proportion of alcohol of 90 per cent., should be rejected.—Schimmel's Report. April, 1895.

Caraway Oil.—J. C. Umney gives sp. gr. not less than 910 at 15° C. Not more than 15 per cent. of the oil should distill below 185°C., and at least 55 per cent of the oil should distill above 200°C.—Pharm. Jour. Trans., 1895, 949.

Helbing and Passmore suggested that the requirements should be (Bull. Pharm., 1894, 257)—Specific gravity, 0.905 to 0.920 at 15° C.; optical rotation, dextro-rotatory, between 75° and 85° in 100 Mm. The oil commences to distill at about 170° C., but more than half distills above 220° C. Two Cc. oil heated in a test-tube at water-bath temperature for five minutes with 1 Cc. phenylhydrazin, solidifies to a mass of light-yellow silky crystals on cooling (presence of carvol). When 2 Cc. of the oil is dissolved in 2 Cc. alcohol, and the solution is saturated with sulphuretted hydrogen, a thick mass of white crystals is formed (presence of carvol). One Cc. of the oil dissolved in 5 Cc. alcohol has a neutral reaction to litmus paper, and does not develop a violet color on addition of ferric chloride (absence of carvacrol or phenols).

The Oil of Canella Alba.—This drug contains 0.85 per cent. of an essential oil. It has a specific gravity of 0.9217, and is dextro-rotatory. The oil contains eugenol, pinene, cineol and caryophyllene.— Pharm. Rund., 1894, 183.

Cassia Oil.—J. C. Umney give the sp. gr. at 15° C. 1.050–1.065. Cinnamic aldehyde should not yield more than 25 per cent. of non-aldehydes when treated with acid sodium sulphite, equivalent to 75 per cent. of cinnamic aldehyde.—Pharm. Jour. Trans., 1895, 949.

Cassia Oil.—This oil is found to contain a stearoptene, which possesses all the properties of an unsaturated aldehyde. It appears to have the formula:

$$C_6H_4 < \begin{matrix} OCH_3 \\ CH = CH.COH \end{matrix}$$

That is, it is probably the b-methyl ester of cumaric acid. It yields the

characteristic bisulphite compound, hydrazone, an oxime of true aldehydes.—Schimmel's Rep., 1894 (Oct.), 14.

Cinnamon Oil.—J. C. Umney suggests the following characters and tests: Sp. gr. at 15° C., 1.024–1.030. Optically inactive. One drop of the oil in five drops of rectified spirit should not give more than a pale green coloration with ferric chloride. The oil should not solidify with a solution of caustic potash. When treated with solution of sodium bisulphite it should not yield more than 45 per cent. of non-aldehydes, equal to 55 per cent. of cinnamic aldehyde.—Pharm. Jour. Trans., 1895, 950.

Oil of Red Cedar Leaves.—Material collected in November yielded 0.14 rectified (0.2 crude) oil of sp. gr. (at 15° C.) 0.886; optical rotation in 100 Mm. tube, + 59°5′. That distilled in August, gave sp. gr. 0.887, and optical rotation + 59°25′. The indications are that it is rich in dextrogyrate limonene.—Schimmel's Report (Oct.), 1894.

Chamomile Oil.—J. C. Umney gives the characters of the pure oil to be sp. gr. — .905 to .912 at 15° C. Optical rotation, + 1 to + 3. — Pharm. Jour. Trans., 1895, 949.

Oil of Citrus limetta Risso.—This oil, according to E. Gildemeister consists of *dextro-limonene*, *lævo-linalool* and *lævo-linalylacetate*. It resembles in its constitution bergamot oil which also possesses dipentene. The oil is brownish-yellow in color, sp. gr., 0.872 at 15°, $[a]_D = + 66° 52'$ at 15°.—Archiv. der Pharm., 1895, 174.

Castor Oil in Croton Oil and Copaiba.—L. Maupy detects castor oil in croton oil by treating the mixture to dry distillation with an alkali, thus forming sebacic acid and caprylic alcohol from the ricinoleic acid. The sebacic acid obtained by treating the solution with a mineral acid is insoluble in cold but soluble in boiling water. In testing copaiba ten (10) Gm. of balsam copaiba are carefully heated in a silver capsule with an equal quantity of soda. If, after frothing ceases, an odor of caprylic alcohol is perceivable, the presence of castor oil is certain. If the reaction product is further warmed with 50 Cc. of water and filtered, the filtrate heated in a porcelain vessel with an excess of nitric acid, raised to the boiling point and filtered while still hot, a white precipitate of sebacic acid will subside on cooling, if the supposed admixture was present. This principle is soluble in boiling water, and from this solution is reprecipitated by lead subacetate.—Jour. Pharm. Chem., 1894, 362.

Cochlearia Oil.—Schimmel & Co. obtained from the oil 0.008 per cent. of oil, of sp. gr. 0.954. The synthetic product made by them is a sufficient substitute.—Report Oct., 1894.

Estimation of Essential Oils, Especially in Oil of Cloves and Oil of Mace.—W. Lenz.—The following is suggested as an improvement on older processes for estimating the amount of oil obtainable from the spice: 10 to 20 Gm. of the powder is mixed with water in a 200 Cc. retort, the beak

of which is inclined upwards, but at its middle is bent downwards at a right angle, and connected with a condenser. 10 Cc. of olive oil is added to prevent frothing, and steam is passed through the mixture as long as any oil distills. The distillate, amounting to about 500 Cc., is saturated with sodium chloride, and extracted by shaking with ether (50 Cc. three times). The ethereal solution is dried by digesting with 20 Gm. of fused calcium chloride for at least three days, and is then evaporated below 30° in a tared flask, through which a current of dry air is passed, until at intervals of five minutes its weight becomes constant. The percentage of eugenol in the oil is then determined by Thom's method. The high solubility of oil of cloves in a 50 per cent. aqueous solution of sodium salicylate led to experiments in which this solution was substituted for water in the retort. The average yield of oil, from the water distillations, was 17.75 per cent., containing 79.44 per cent. of eugenol, from the salicylate 19.45 per cent., containing 84.52 per cent. of eugenol, the latter yield agreeing better than the former with that obtained on the large scale. Similar experiments with mace, the oil of which is nearly insoluble in salicylic solution, gave one-fourth more oil with the salicylate than with water, and that the action is not due to a mere rise in the boiling point of the solution is shown by the fact that solutions of potassium acetate and of calcium chloride have no such effect. The behavior of the salicylate seems rather to be due to its peculiar solvent action on the plant tissues, which renders it such a valuable liquid for mounting microscopic preparations.—Zeit. f. anal. Chem., 1894, 193.

Clove Oil.—J. C. Umney suggests the following characters of the pure oil: Sp. gr., not below 1.050 at 15° C.; optical rotation, not more than —10° in 100 Mm. tube. When treated by saponification with 10 per cent. potash solution, not more than 15 per cent should remain uncombined, equal to 85 per cent. of eugenol. No portion of the oil should distill below 247° C.—Pharm. Jour. Trans., 1895, 951.

Cubeb Oil.—Helbing and Passmore (Bull. Pharm., 1895, 258) consider that the sp. gr. should be at 15° C., 0.910 to 0.930. Optical rotation, lævo-rotatory to the extent of about 40° in 100 Mm. Not more than one-tenth of the oil distils below 250° C., and the bulk passes over between 250° and 280° C.

Terpineol from Oil of Erigeron Canadense.—Hunkel has prepared the terpineol-nitrosochloride according to Wallach's method, and from this the nitrol piperidine base. The crude product had m. p. 157° to 164°. Upon recrystallization from ether the m. p. was 159° to 160°, corresponding with that of terpineol nitrol piperidine of Wallach.—E. Kremers, in Pharm. Rund., 1895, 137.

Oil of Erigeron.—Schimmel and Co. obtained 0.33 per cent. of oil from the fresh flowering herb. It possesses a yellow color and an aromatic and

persistent odor. The sp. gr. at 15° C. is 0.868, and optical rotation + 52° in a tube of 100 Mm. These results are much at variance with those of Todd in Amer. Jour. Pharm., 1887, 305.—Report (Oct.), 1894.

Eucalyptus Oil.—Helbing and Passmore (Bull. Pharm., 1895, 259), suggest the following requirements: Specic gravity, 0.910 to 0.930 at 15° C.; optical rotation, dextro-rotatory, not more than 10° in 100 Mm. The oil distills mainly between 173° and 185° C., and at least 80 per cent. between 170° and 190° C., which fraction yields not less than 50 per cent. of recrystallizable eucalyptol when cooled to —16° C. The first fractions of the oil do not give a crystalline compound with bisulphite of soda, nor induce coughing on inhalation. The oil dissolves in an equal volume of alcohol, and is neutral to litmus paper. If eucalyptol be substituted for the essential oil, it should possess the following characters: Specific gravity, 0.926 at 15° C. Optically inactive. Boiling point, 176° C. When cooled a few degrees below 0° C. it solidifies to a crystalline mass, which completely liquefies at —1° C.

Oil of Hops.—A. C. Chapman.—Hops yield 0.3 per cent. of a pale yellow, but strong smelling oil. Two samples were distilled by Chapman from Kentish hops, and two obtained from Messrs. Schimmel from Bavarian hops. Their composition was practically identical. The principal constituent was a body, $C_{10}H_{17}$, which was found to be composed of $C_{10}H_{16}$ and $C_{10}H_{18}$. There was also a sesquiterpene, which differed in some respects from the other four sesquiterpenes known. Its behavior with nitrosyl chloride and pyridine were the two principal points of this difference.—Jour. Chem. Soc., 1895, 54.

Oil of Indigofera Galegoides.—This oil is of a pale yellow color and a bitter-almond like odor with an aromatic subsidiary odor. Its sp. gr. is 1.046. According to the investigation of van Romburgh the plant contains a constituent which when brought into contact with emulsin yields among other bodies, prussic acid and benzaldehyde. The constituent may be amygdalin or laurocerasin, but it was not obtained in a crystalline form. The yield of oil is about 0.2 per cent.—Schimmel's Report, Oct., 1894, p. 73.

Oil of Lavender.—Massol has recently examined two specimens, of undoubted genuineness, of oil of lavender (true) and oil of *Lavandula spica*. He gives the density and the rotatory power, and compares them with those given by other observers. He concludes that neither character is of any service in the examination of the oils. The figures are:

		Massol.	Buignet.	Bruylants.
Ol. lavand. ver.	density	.930	.886	.876
	opt. activity	—3°7′	—21°20′	—2°29′
Ol. lavand. spic.	density	.935	—	.908
	opt. activity	9°66′	3°30′	—0°35′

—Jour. Pharm. Chem., 1895, 49.

Oil of Lavender.—Helbing and Passmore (Bull. Pharm., 1895, 259) suggest the following requirements: Specific gravity, above 0.880 at 15° C.; optical rotation, lævo-rotatory, 5° to 10° in 100 Mm. The oil dissolves in three parts of alcohol of 70 per cent. strength at 15° C. When 10 Gm. of the oil is heated in an autoclave at 100° C. for two hours with 10 Cc. of alcoholic potash solution requiring 17.5 Cc. volumetric solution of sulphuric acid for neutralization, using phenolphthalein as indicator, on cooling and titrating, the saponified liquor requires not more than 14.5 Cc. volumetric solution of sulphuric acid for neutralization.

Oil of Lemon.—A. A. Barrett finds that the polariscope and refractometer both fail to give results by which one is able to detect adulteration. Turpentine may be so employed with the oil that by a simple proportion a mixture can be made that is indistinguishable, either by means of the polariscope or refractometer. The tests for mineral oil, with alcohol, by evaporation on a piece of paper, are delicate and reliable. The direction in which progress is to be looked for now is chemical rather than physical examination. What is wanted is to select some one constituent which is present in constant proportion, and determine the amount of this.—Pharm. Jour. Trans., 1894, 255.

Oil of Lemon Grass.—Barbier and Bouveault find that the lowest fraction of this oil, boiling at 170° to 175°, which is usually regarded as a terpene, really consists of a mixture of a non-saturated ketone and a terpene. The ketone, separated by means of the bisulphite compound, has the composition $C_8H_{14}O$, and its constitution would seem to be meythylhexylene-ketone, $C(CH_3)_2.CH.CH_2CH_2.CO.CH_3$. The terpene associated with it sometimes yields a bromo-derivative, but is not a limonene, and its absence in some cases and the great variation in its proportion in others indicate that it has been added as an adulterant. The authors further find that the aldehyde contained in the oil and termed geranaldehyde has the constitution $CH_2 = CCH_3 — CH_2CH_2.C — COH — C(CH_3)_2$ and not that ascribed to it by Tiemann and Semmler.—Compt. rend., 118, 983.

Limetta Oil.—An interesting treatise on the botanical origin of the lime fruit and on the preparation of the oil appears in the Kew Bulletin No. 88 of April, 1894. While the lime (*Citrus Limetta* Risso), growing in Southern Europe, has a sweet juice, that of the West-Indian fruit is acid.

According to the latest investigations, the West-Indian tree is to be regarded as a variety of *Citrus medica*, which has been named *C. medica var, acida* Brandis. It is cultivated chiefly in Montserrat, Dominica, and Jamaica for the sake of the fruit-juice and the essential oil. The former is expressed by crushing the fruit between heavy rollers; it is exported either in the original condition or is first evaporated to about $\frac{1}{10}$ of its volume. During this evaporation an essential oil is obtained as a bye-product and put upon the market as "oil of limes." It has an odor not particularly pleasant nor like that of citral, and is quite different from the expressed oil. This latter is generally obtained by the ecuelle process. The "ecuelle" is a copper basin furnished on the inside with numerous prominent studs on which the peel of the fruit is scarified. so that the oil, which has a very agreeable and strong odor of citral, runs out. In commerce it is known as oil of limetta.

Several oils investigated showed the following constants:

DISTILLED OILS FROM DOMINICA.

No. 1. Sp. gr. 0.868. Opt. rot. + 38° 35′. Boiling point between 175—200° C.

No. 2. Sp. gr. 0.867.

EXPRESSED OILS.

No. 1. From Monsterrat. Sp. gr. 0.882. Opt. rot + 35° 40′.

No. 2. From Dominica. Sp. gr. 0.882. Opt. rot + 37° 55′.

—Schimmel's Report (Oct. 1894), 34.

Marsh Tea Oil.—Schimmel and Co. recently distilled some tops of the shrub of Ledum palustre, L., obtained from Sweden, and obtained 1.2 per cent. of an oil which, owing to its large content of ledum camphor, was full of crystals at a summer temperature. The oil which was separated from the camphor at a moderate temperature was of a greenish hue, and sp. gr. 0.963 at 15° C. Ledum camphor is $C_{15}H_{26}O$, and hence probably a sesquiterpene. It crystallizes from alcohol in beautiful needles of m. p. 105°. —Ibid., 37.

Muscatel-Sage Oil.—The oil is distilled from the herb Salvia sclarea, L., and possesses an odor of lavender and an after smell strongly reminiscent of ambergris, which persists for weeks afterwards. Its sp. gr. is 0.928, and its optical rotation in a 100 Mm. tube is 24°1′ to the left. The saponification figure of the oil is 144. It indicates the presence of 50.4 per cent. of linalyl acetate.—Ibid., 38.

Artificial Oil of Neroli.—Schimmel & Co. announce that they have succeeded in isolating the body which represents the peculiar, characteristic odor of orange flowers; and not only that, but they have succeeded in establishing the chemical nature, and effecting the synthesis of the respective body. The characteristic constituent of neroli oil they say is present to the extent of 1½ per cent. The synthetic oil is claimed to correspond per-

fectly with the natural product from the fresh flowers of *Citrus bigarradia*, for which they wish to have it considered a substitute of highest perfection possessing all its chemical and physical properties. For the present all details about this discovery are withheld.—West. Drug., 1894, 239. (See Schimmel's Rep., April, 1895, p. 74.)

Nigella sativa Oil.—The seed of the plant yields 0.46 per cent. of a yellowish oil of disagreeable odor, possessing the following properties: Sp. gr. 0.875, optical rotation + 1° 26 at 15°, boiling point, 170 to 260° C. Unlike the oil of Nigella damascena, this oil is not fluorescent.—Schimmel's Rep., 1895 (April), 75.

Nutmeg Oil.—J. C. Umney suggests the following characters: Sp. gr. —.870–.910 at 15° C. Optical rotation from + 15 to + 25 in a tube of 100 Mm. Soluble in an equal volume of a mixture of equal parts rectified spirit and absolute alcohol. Absence of fixed oil. The oil should not leave a crystalline residue when evaporated on a water bath.—Pharm. Jour. Trans., 1895, 1039.

Orange Oil.—J. C. Umney suggests the following as the most desirable requirements for ol. aurantii amar., obtained by expression from the fresh peel of Citrus vulgaris. Sp. gr. —.848 to .856 at 15° C.; rotation not less than +92 in a tube of 100 Mm.—Pharm. Jour. Tran., 1895, 1839.

Sweet Orange Oil.—Schimmel and Co. say that every adulteration of orange oil has the offect of reducing the specific rotatory power, and as a matter of fact this is so marked that even a few volumes per cent. of turpentine oil can be detected with certainty by the polarimeter. A rotatory power of +96° must be regarded as the lowest limit of reliable sweet orange oil.—Report (Oct.), 1894, p. 26.

Smyrna Origanum Oil.—According to E. Gildemeister this oil is probably obtained from *O. smyrnacin.* L., and consists principally of *lævolinalool.* It also contains carvacrol and cymol, and a small quantity of a related product which has not been determined. The author has examined the linalool from various sources, and gives a table of comparative results.—Arch. der Pharm., 1895, 182.

Essence of Pelargonium.—Barbier and Bouveault assert that Bertram and Gildemeister are wrong in concluding that the linanool of *Andropogon schœnanthus*, the alcohol of essence of pelargonium, and the rhodinol of otto of rose are identical. The alcohol provisionally termed the rhodinol of pelargonium possesses a strong odor of roses, has a density of 0.8866, and is associated with another compound, greatly resembling licareol. Altogether, it is found that the essence of pelargonium contains six different substances, the rhodinol-like alcohol predominating. The constitution of this alcohol is considered in a subsequent paper by the same authors.—Compt. rend., cxix., 281 and 337.

Peppermint Oil.—An examination of an oil of peppermint distilled in

Chile, South America, possesses a specific gravity of 0.916, and was characterized by an intense odor of pennyroyal, a property which, of course, is not desirable in oil of peppermint.—Schimmel's Report, Oct., 1894.

American Peppermint Oil.—F. B. Power and C. Kleber (Pharm. Rund., July 1, 1894,) have examined the constituents of peppermint oil. It contains acetic (0.044 per cent.) aldehyde and isovaleric aldehyde (0.048 per cent.) and also small amounts of free iso-valerianic and acetic acids. The portion distilling between 100° and 155° was suspected to contain amyl-alcohol. Between 155° and 170° gave a part which yielded crystals of pinene piperidyl-nitrolamine. This pinene appears to be chiefly either per se inactive, or a nearly compensating mixture of the dextrogyrate and lævogyrate forms. The authors positively conclude that American Peppermint Oil *does not contain menthene.* From the portion boiling at about 170° C. nitrite of phellandrene was obtained. The portion distilling at 174–177° C. contained cineol. The portion between 175° and 177° C. yielded dipentene tetrabromide; limonene tetabromide was readily obtained from the respective fraction. It appears somewhat doubtful whether dipentene is contained in the original oil, for it may possibly have been formed from the other terpenes or from cineol as a secondary product.

The fraction between 177° and 205° C. yielded menthone and menthol. The portion between 209° and 220° C. consisted chiefly of menthol. After distilling up to 220° C. the portion remaining in the flask by subsequent treatment yielded a resin and an oil which by distillation was resolved into menthol and a thick oil (270° and 280° C.) possessing an odor resembling cedar wood. It was thus evident that esters of menthol were contained in the original oil. The oil of cedarwood-like odor yielded cadinene, and it is to the latter compound that the peculiar color reactions of peppermint oil are due. A substance was also obtained possessing an odor of borneol camphor and because of reactions with sodium in potassium hydrate is characterized as a lactone. Solutions of oxy-acid or of the lactone do not decolorize bromine, nor do its solutions in alkali decolorize a cold solution of $KMnO_4$. At the temperature of the water-bath, however, permanganate gradually becomes decolorized. By treatment with the latter a product was obtained in needles (m. p. 90° C,) of composition $C_{10}H_{18}O_3$ consisting chiefly of the unattached oxy-acid. The authors are continuing their investigations but express the supposition that the acid in question is formed from menthol by the oxidation of a methyl group to carboxyl. Besides acetic and isovaleric esters, an acid of the formula $C_{10}H_{16}O_2$ was obtained in the form of a yellowish oil.

Peppermint Oil.—J. C. Umney recommends the following characters and tests: Sp. gr. at 15° C., 0.900–.910; optical rotation, —25 to —32 in a tube of 100 Mm. Not less than 50 per cent. should distill between 210°–220° C.—Pharm. Jour. Trans., 1895, 1041.

Peucedanum Oil.—From the dried root Schimmel and Co. obtained 0.2

per cent. of a yellowish-brown oil of a most intense and lasting, but not very agreeable odor, resembling most of all that of senega root. The saponification factor was 62. The sp. gr. of the oil was 0.902 at 15° C. and its optical rotation + 29° 4′ at 15°. When left standing in the cold the oil separates a solid body, which recrystallizes in yellowish scales and has a m. p. 100°.—Report, April, 1895.

Oil From Picea nigra.—The oil distilled from the twigs and cones gave oil of sp. gr. (before drying) 0.9222 and (after drying) 0.9228; $[a]_D = -39.45°$. A year later the sp. gr. was found to increase slightly and the rotatory power underwent a corresponding slight diminution. The B. P. rises constantly between 160 to 230° C. It yielded 48.85 per cent. of bornyl acetate.—E. Kremers in Pharm. Rund., 1895, 135.

Pimento Oil.—J. C. Umney gives the following as the principal characters of pure oil: Sp. gr.—Not below 1.040 at 15° C. Optical rotation, not more than —4. When treated with solution of caustic potash not more than 25 per cent. should remain uncombined, equal to about 75 per cent. eugenol. Not more than 40 per cent. should distil below 247° C.—Pharm. Jour. Trans., 1895, 1041.

Oleoresin from Pinus Cubencis Gries.—The virgin dip examined by Hunkel gave sp. gr. at 20°C., 1.0253 and $[a]_D = -32.423°$. The oleoresin appeared to change upon standing into a lighter semi-transparent layer and a heavy granular mass that separated to the bottom. Upon heating the modified virgin in a water-bath the granules evidently dissolved and the oleoresin became emulsion-like, remaining thus for a long time. Distillation with water-vapors gave 16 per cent. of volatile oil, the sp. gr. of which at 20° C. = 0.8650; $[a]_D = + 9.6$. The sp. gr. and rotating power increase upon standing. This oil and that of P. sylvestris are similar. Fraction 159–161° of oil from P. cubensis invites further investigation.—Ed. Kremers in Pharm. Rund., 1895, 136.

Oleoresin from Pinus Palustris.—E. Kremers finds the crude turpentine from the yellow or Georgia pine to possess $[a]_D = -13.665$. It yielded upon distillation with steam 22.5 per cent. of volatile oil of sp. gr. 0.8612 and $[a]_D = + 23.93$ (in 100 Mm. tube) and $= + 23.79°$ (in 200 Mm. tube). Four distinct fractions were obtained by fractional distillation. The oil consisted of relatively pure pinene. From fractions 153–154° and 154° pinene nitrosochloride was prepared and the yield of nitrosochloride was determined. The data obtained agree with the statement (E. W. Smith, Proc. Wisconsin Pharm. Assoc., 1893, 73) that the greater the rotatory power of pinene, the smaller the yield of nitrosochloride. The residue, upon distillation of the oleoresin with water vapor was amorphous and yielded crystals, evidently abietic acid.—Pharm. Rund., 1895, 134.

Rose Oil.—J. C. Umney suggests the following two characters to be those of the purest oils of Turkish distillation met with in trade.—Sp. gr.

at 20° — 860 to 870. M. p. from 19 to 22° C.—Pharm. Jour. Trans., 1895, 1042.

Bulgarian Rose Oil.—The total output from Bulgaria will be about 2200 kilos, which exceeds that of last year by 10 to 15 per cent. Those contemplating purchasing large quantities of otto, will do best by awaiting further developments, as prices may recede.—Schimmel's Report, Oct., 1894.

Rose Geranium in Otto of Rose.—R. Tedermann has been experimenting on the detection of geranium oil in otto, and has come to the conclusion that there is no reliable test. Schiff's color-reaction and Hager's turbidity-test are both unsatisfactory, and the freezing point and specific gravity of the oil is conclusive. The specific gravity of otto of rose varies according to the conditions of production and preparation. Its pure stearoptene has a specific gravity of 0.813, while that of the stearoptene-free oil varies from 0.8730 to 0.8735. As the amount of this constituent in Balkan rose oil varies from 7 to 30 per cent., and as the specific gravity of geranium oil lies between 0.882 and 0.895, an otto containing but little stearoptene, and consequently having a high specific gravity, is liable to be suspected of adulteration; on the other hand, the detection of very small quantities of geranium oil is impossible. The behavior of otto towards polarized light is also useless as a test, since rhodinol and geraniol are isomeric bodies, and behave similarly in this respect.—Zeit. Anal. Chem., 1895, 5.

Rosemary Oil.—J. C. Umney suggests the following as the characters of the pure oil: Sp. gr.—.900 to .920 at 15° C. Should be soluble in twice its volume of rectified spirit. Not more than 25 per cent. should boil below 170° C., and not less than 15 per cent. above 200° C.—Pharm. Jour. Trans., 1895, 1043.

Rue Oil.—J. C. Umney suggests that the pure oil should possess the following characters: Sp. gr. — 0.835 to — 0.840 at 15° C. Rotation should be slightly dextrorotatory. Not more than 5 per cent. should boil below 200° C. The oil should solidify on cooling to a temperature of about 4° C., and should afford a crystalline compound with a saturated hot solution of sodium bisulphite.—Pharm. Jour. Trans., 1895, 1044.

Sandalwood Oil.—E. J. Parry calls attention to the adulteration of sandalwood-oil capsules with 28 parts of cedar oil. He recommends the following test, being a modification of Mesnard's test: Five or six drops of the oil are placed on a glass or glazed porcelain slat, and two drops of concentrated sulphuric acid are dropped on the centre of the mass. The whole is rapidly and thoroughly stirred with a glass rod, without spreading the mass further than necessary, and allowed to stand for three minutes. If the oil is pure it will darken to a homogeneous color, and become very viscous, sticking fast to the plate and eventually becoming almost pasty;

and if a gentle stream of water from the top be allowed to fall on the plate, which is held nearly vertical, and then to run over the mass, it will not be washed away in the course of a minute or two. If the oil is adulterated with cedar oil, the mass still darkens, but does not become so homogeneous and does not thicken to anything like the same extent, and the bulk of the mass is quickly washed away by the stream of water. If the pure and the adulterated oil are treated exactly the same, side by side on the same plate, and the water allowed to run over them both at the same time, taking care that it reaches both masses simultaneously, the two being in the same horizontal line under the tap, the difference is very marked. The amounts of oil and acid used are of importance, and should be adhered to. —Chem. Drug., 1894, 460.

Oil of Sandalwood.—C. A. Serre illustrates a clipping machine and sandal still, and gives the details of method for distilling the oil.—Bull. Pharm., 1895, 55.

Santal Oil.—J. C. Umney gives the following as the principal characters and tests of a pure East Indian oil: Sp. gr., not below .975 at 15° C.; optical rotation, not less than —16, and not more than —20. The greater portion distills between 275° C. and 295° C. One part of the oil should dissolve in 6 parts of alcohol of 70 per cent. by volume at 20° C.—Pharm. Jour. Trans., 1895, 1045.

Peculiar Sandalwood Oil.—In a report on essential oils, issued by Hænsel and Co., East Indian sandalwood is discussed. It is here stated to have a specific gravity of .9494 at 15.5° C., and a refractive index of 1.49. It is said to rotate the plane of polarization in a 100 millimetre tube, $[a]_D = -41.4°$, and to dissolve in five volumes of 75 per cent. alcohol.—Drug. Zeitung, from Brit. and Col. Drug., 1894.

Spearmint Oil.—J. C. Umney gives as the characters and tests the following: Sp. gr., at 150° C., .920 to .940, optical rotation in a tube of 100 Mm. —35 to —50. Not less than 35 per cent. should boil between 222°+ and 226° C. One part should dissolve in one part of alcohol 90 per cent. strength, becoming turbid on further dilution.—Pharm. Jour. Trans., 1895, 1045.

Spike Oil.—One part by volume of spike oil must give a clear solution with 3 parts of alcohol of 70 per cent., at a temperature of about 20°.—Schimmel's Report, Oct., 1894.

Oils of Spike and Lavender.—G. Massol has had an opportunity of determining and comparing the rotatory power of genuine oils of spike and lavender. The determinations were performed at 15° with a Laurent's polarimeter, a 100 Mm. tube being employed, and yielded the following results, the calculations being based on the formula $[a]_D = \frac{c}{bd}$:

	Rotation.	Density.
Oil of Lavender	—3.70°	0.930
Oil of Spike	+9.66°	0.935

It is pointed out that these figures differ from those formerly recorded, Buignet having published the following:

	Rotation.	Density.
Oil of Lavender	—21.20°	0.886
Oil of Spike	+3.30°	"

Whilst Bruylants' figures were equivalent to—

	Rotation.	Density.
Oil of Lavender	—2.29°	0.876
Oil of Spike	—0.35°	0.908

Samples of oil kept by Massol in well stoppered bottles, and exposed to diffused light for thirteen months, showed no variation in rotatory power. He concludes that Flückiger's statement that the rotatory power of essential oils must vary with their extremely variable composition is correct, and that, in view of the differences in the results published by different observers, the physical constants referred to cannot be depended upon to discriminate between the oils of two such closely allied species as Lavandula vera and L. spica.—Jour. Pharm. Chim., 1895, 49.

Thyme Oil.—J. C. Umney gives the following as the characters of the pure oil: Sp. gr.—Not below .905 at 15° C. Rotation, not more than —6. At least 25 per cent. should boil above 220° C.—Pharm. Jour. Trans., 1895, 1046.

Vitex Trifolia L.—The leaves yield an agreeably aromatic oil, that is slightly camphoraceous. The latter property is due to the presence of cineol, which was detected by means of Hirschsohn's iodol-reaction.—Schimmel's Report, Oct., 1894, p. 73.

Light Oil of Wine.—L. F. Kebler (Amer. Jour. Pharm., 1895, 28) examined 4 commercial samples. One was adulterated fusel oil, two others mixtures of ether, alcohol and heavy oil of wine, and the other, a mixture of commercial ether and heavy oil of wine.

Artificial Oil of Wintergreen.—H. T. Thayer recommends the following process (Amer. Jour. Pharm., 1895, 244) which it is said may be made at the cost of 90 cents per pound:

Salicylic acid	505.470 Gm.
Methyl alcohol	690.850 "

The salicylic acid was added in portions to the methyl alcohol contained in a wide-mouthed flask until a saturated solution was obtained. This solution was then heated to the boiling point on a water bath, the flask having been connected with an upright condenser. Dry hydrochloric acid

gas was passed into the hot solution until the latter was thoroughly saturated. The flask was then disconnected, an addition of about ten Gms. of salicylic acid made, the flask replaced, and the solution again completely saturated with the hydrochloric acid gas. Such additions of salicylic acid and subsequent treatment with hydrochloric acid gas were repeated until all of the former substance had been added. After the last addition, the passage of the hydrochloric acid gas was continued for about two hours.

The contents of the flask were then found to have separated into two distinct layers, the lower of which was an oily liquid of a dark brown color. The upper layer was decanted, the lower washed with water until no longer acid to litmus paper, and then distilled from a flask with the aid of live steam.

The oil was separated from the excess of water by means of a separating funnel, and afterwards completely dried by the use of anhydrous calcium chloride.

The salicylic acid used had a melting point of 156°–157° C. It was dried at 100° C. The methyl alcohol boiled between 58° and 72° C., and had a specific gravity of .820. Especial care must be bestowed upon the drying of the hydrochloric acid gas. The present operator found it necessary to pass the gas over anhydrous calcium chloride and through three bottles of sulphuric acid. The quantities directed above yielded 500 Gm. of a colorless, slightly yellowish oil, which had an agreeable odor, a specific gravity of 1.187 and a boiling point of 221° C.

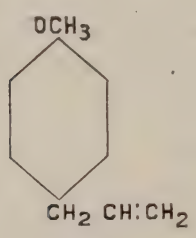
TERPENES AND CAMPHORS.

Terpenes and Ethereal Oils.—O. Wallach.—When limonene tetrabromide is warmed on the water-bath with a solution of sodium in methylic alcohol, a compound is obtained which has the constitution $C_{10}H_{14}Br.OMe$; it boils at 137°–140° (14 Mm.); the sp. gr. = 1.251 at 18°, and n_D = 1.51963 at the same temperature. When treated with hydrogen bromide in glacial acetic acid, it yields dipentene tetrabromide, and the action of sodium ethoxide gives rise to carveol methyl ether, $C_{10}H_{15}.OMe$, an oil of pleasant odor, which boils at 210°–212°, has a sp. gr. = 0.9065 at 18°, and a specific refractive index n_D = 1.47586 at this temperature. On oxidation with chromic anhydride in glacial acetic acid solution, carveol methyl ether yields carvone, the transformation of limonene into carvone being thus effected. Terpineol also may be converted into carvone in a similar manner, since the tetrabromide yields carveol methyl ether by the action of sodium methoxide. Cymene is formed when terpineol tribromide is boiled with alcoholic potassium cyanide. The author cannot confirm this former conclusion, that the dipentene dihydriodides described by him correspond with V. Baeyer's dihydrobromides and dihydrochlorides. The sole product of the action of phosphorus triiodide on terpinhydrate is the hydriodide $C_{10}H_{18}I_2$, which melts at 70°. Pinole dibromide is converted

into cymene by energetic reducing agents, such as formic acid or zinc dust and glacial acetic acid; the latter also gives rise to the diacetate of pinole glycol when boiled, whilst under other conditions solid terpineol is formed. Pinole tribromide, $C_{10}H_{17}OBr_3$, is most conveniently prepared by treating pinole dibromide with hydrogen bromide in glacial acetic acid. When reduced in alcoholic solution with sodium, it yields a compound which boils at 325°; the oxime melts at 82°–83°. If reduction is effected by means of zinc dust and glacial acetic acid, an unsaturated ketone, $C_{10}H_{16}O$, is formed, boiling at 213°–218°; the secondary alcohol, $C_{10}H_{18}O$, derived from this substance, boils at 218°–220°, and has the specific rotatory power $n_D = 1.47096$ at 21°, and the sp. gr. = 0.91 at the same temperature. The alcohol is very viscous, and has a pleasant odor resembling that of linaloöl and terpineol; the ketone is regenerated from it by oxidation. The author discusses the constitution of pinole, representing it by the formula $CH<\begin{matrix}CMe.CH\\CH_2.CPr\end{matrix}>CH_2>O$.—Ann. der. Chem., 1894, 827.

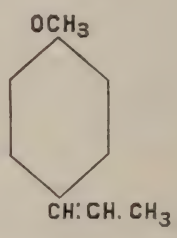
Constitution of Anethol.—Two formulas have been proposed for anethol, differing, however, only in the union of the carbon atoms in the side chain. The formulas are:

1.



1, 4, methoxy-allyl-benzene.

2.



1, 4, propenyl-methoxy-benzene.

Hell has investigated this question and has proved that the first formula is the correct one, and that anethol obtained from star-anise oil, and of b. p. 228°–229°, is 1–4 methoxy-allyl-benzene. He has proved this by the preparation of a brominated ketone and ketone acid from the monobromanethol dibromide. When anethol is treated with bromine, three bromine atoms enter the molecule and mono-bromanethol dibromide is formed, which, if the above formulas are correct, would be,

(1) $C_6H_3Br.OCH_3.CH_2.CHBr.CH_2Br$ (Allyl),

Or

(2) $C_6H_3BrOCH_3CHBr.CHBr.CH_3$ (Propenyl).

This dibromide, on boiling with zinc dust, loses two atoms of bromine, and yields a polymer of mono-bromanethol. When the dibromide is oxidized by a solution of chromic acid in acetic acid a (HBr) group is replaced by (O), and a brom-ketone is formed. These brom-ketones would also be derived from the dibromide, and would be,

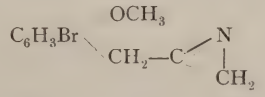
(1) $C_6H_3Br.OCH_3.CH_2.CO.CH_2Br$ (Allyl),

Or

(2) $C_6H_3.Br.OCH_3.CO.CHBr.CH_3$

Or $C_6H_3.Br.OCH_3.CHBr.CO.CH_3$ } (Propylene).

Being derived from the above formulas of the dibromide by replacement of (HBr) by (O). On oxidation, bodies of these different formulas should yield different products, the CH_2Br, or CHBr, being properly oxidized to COOH. On oxidizing the brom-ketone derived from anethol with potassium permanganate, a ketonic acid is formed of the formula $C_6H_3.Br.OCH_3.CH_2.CO.COOH$, which we should expect to be formed if (1) is the correct formula, and the formation of which could hardly be explained from (2). Anethol has, therefore, the first formula, and is para-methoxy-allyl-benzene. During the course of the investigation the acetate of the ketone was formed, as well as a body of the formula—

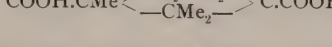


by reaction of ammonia with ketone.—Jour. f. Prakt, Chem., li., 422.

Nitrocamphor.—N. Tarugi.—On reducing β-nitrocamphor melting at 83° with sodium in alcoholic solution, a sodium salt, which is very soluble in water, but practically insoluble in concentrated soda, is obtained; it yields a yellow flocculent substance on treatment with hydrochloric acid. This, when heated with acetic acid, is converted into α-nitrocamphor, melting at 102–103°.—Gazzetta, 1894, 528; Jour. Chem. Soc., 1895, 60.

Relation Between the Rotatory Power of Camphor and the Molecular Weights of Certain Solvents.—Moreau.—Tables showing the rotatory power of camphor dissolved in aromatic hydrocarbons, alcohols of the fatty series, acids of the fatty series, and alkyl salts of fatty acids, are given.—Jour. Pharm., Chim., 1894, 14.

Constitution of Camphor.—J. Bredt.—It is known that when camphor is oxidized the product consists to the extent of about two-thirds of camphoric and camphoronic acids. The author has now shown that the remainder contains oxalic dimethylmalonic, succinic and trimethylsuccinic acids. The method adopted was to convert the mixture of acids into a mixture of their ethylic salts, and to fractionate this under diminished pressure. The formation of these acids is further evidence in favor of the author's formula for camphor. In the rest of the paper he attempts to refute the objections of Aschan, and assigns the formula:



to isocampanic acid, the relation of which to various other acids obtained from camphor is discussed.—Ber. d. Chem. Ges., 1894, 2092.

Bredt's Camphor Formula.—A. Aschan considers Bredt's formula for camphor the best hitherto suggested, but it fails to explain the non-formation of an unsaturated acid or anhydride by the elimination of hydrogen bromide from bromocamphoric anhydride; that the bromine in this compound is linked to a tertiary carbon atom, as in bromobenzene, is irrelevant, since the anhydride does not contain a benzene linkage. The readiness with which hydrogen bromide is eliminated from the two α-bromohexahydroterephthalic acids, α-bromohexahydrobenzoic acid, α-bromohexahydroparatoluic acid, and from α-bromethylcyclopentanecarboxylic acid, would suggest that bromocamphoric anhydride, which, like this last acid, contains the group $CH_2.CBr.CO$, should behave in a similar manner. Since the bromine atom is readily eliminated, we must conclude that it is probably linked to a secondary carbon atom, which is itself linked either to two tertiary carbon atoms, or to one of these and to a carboxyl group. Similar arguments are applied to bromocamphor; according to Bredt this contains the group CH.CHBr.CO, but in this case, too, hydrogen bromide is not eliminated, as from analogy would be expected. The compound remains unaltered by prolonged boiling with aniline or quinoline. Bromocamphocarboxylic acid is readily prepared by the action of bromine on camphocarboxylic acid in glacial acetic acid solution, and melts at 112–113°; the substance obtainedby Silva's method is impure, and melts at 109–110°. Bromocamphor was prepared from the preceding compound by the action of alcoholic potash at the ordinary temperature.—Ber. d. Chem. Ges., 1894, 1439.

Camphor Trade of Tamsin, China.—The trade in this product is rapidly growing in importance. The export in 1893 was much the largest on record, and more than double that of the previous year, amounting to 32,134 cwts., against 15,440 cwts. for 1892, which total, however, in consequence of disturbances on the border, was smaller than in 1891.—Consular Report; Pharm. Jour. Trans., 1894, 238.

Organo-metallic Compounds of Borneol, Camphor and Monochlorocamphor with Aluminum Chloride.—G. Perrier.—The borneol compound, $(C_{10}H_{18}O)_2Al_2Cl_6$, is very unstable; benzene, toluene and chloroform decompose it partially in heat, with liberation of hydrochloric acid. Water decomposes it briskly, giving a solution of aluminum chloride and reproducing borneol. The camphor compound, $(C_{10}H_{16}O)_2Al_2Cl_6$, is decomposed by water, with the reproduction of camphor. The monochloro compound $(C_{10}H_{15}ClO)_2Al_2Cl_6$, is very unstable in air and is decomposed by water.—Compt. rend., 1894.

Campholene.—M. Guerbat.—Campholene is a colorless liquid, of an odor analogous to that of turpentine, and a burning taste. It boils at 134° under the pressure of 758 Mm. In the liquid state its sp. gr. is 0.8115. It is without rotatory power. It is insoluble in water, but soluble in alco-

hol, and mixes with ether, chloroform and carbon disulphide. The author has studied its behavior with bromine, gaseous hydriodic acid, a mixture of fuming nitric and sulphuric acids, with bromine in presence of aluminum bromide.—Bull. Soc. Chim., vols. xi–xii., No. 9.

Cedar Wood Camphor.—Recent researches, according to Schimmel's Report, (April, 1895, p. 24) have pointed to the non-existence of cedar camphor in cedar wood oil. A small quantity of cedar wood which had been kept in stock for many years was recently distilled and yielded a thick oil, which went almost solid by standing. Through recrystallization from alcohol a body was obtained in fine needles, softening at 78° C., and entirely melting at 83° C. It appears that the camphor is formed under these conditions, but is not a constituent of normal cedar oil.

Synthesis of Symmetrical Carvacrol.—E. Knoevenagel.—Metacamphor when submitted to the action of bromine in acetic acid solution yields an unstable dibromide ; this readily loses the elements of hydrogen bromide, yielding symmetrical carvacrol, which melts at 54° and boils at 241°.—Ber. d. Chem. Ges., 1894, 2347.

Citronellal and Citral.—O. Doebner has obtained by the action of β-naphthylamine and racemic acid upon citral and citronellal respectively citryl—β-naphthocinchonic acid and citronellal—β-naphto-cinhonic acid.—Archiv. der. Pharm., 1894, 688.

Velocity of Cumarin Formation. — E. Hyelt. — Cumaric, methyl cumaric, and isopropyl cumaric acids exhibit great velocity of cumarin formation, 40, 90, and 70 per cent. respectively undergoing conversion into the anhydride within 40 minutes, and this in spite of the fact that they are β-hydroxy-acids. Probably the double bond conditions the existence of the cis-configuration, which is known to be favorable to anhydride formation.—Ber. d. Chem. Ges., 1894, 3331.

Adulteration of Cumarin.—Fritzsche Bros. call attention to an adulterated product upon the market containing 36.05 per cent. acetanilid. The tests for this product may be applied as follows :

" When a little of the substance was heated with metallic sodium, the fused mass dissolved in water and tested with ferrous sulphate, etc., in the usual manner, a precipitate of Prussian blue was obtained, thus showing the presence of nitrogen, an element which is not contained in pure cumarin. When heated with a 3 per cent. solution of potassium hydrate for an hour, at a temperature of about 60° C., it developed the peculiar odor of aniline ; and when a few drops of chloroform were subsequently added and the mixture again gently heated, the characteristic and intensely disagreeable odor of phenyl-carbylamine was produced—the so-called iso-nitril reaction. With chlorinated lime it also gave the blue color reaction characteristic of aniline. The alkaline solution, including the crystalline laminæ which separated therefrom on cooling, was shaken with

ether, the ethereal solution separated and allowed to evaporate, when a crystalline mass was obtained, which, when crystallized from dilute alcohol, formed glistening laminæ, melting at 114° C."

Acetanilid, popularly known as antifebrin, appears to have been quite extensively employed of late for the adulteration or sophistication of organic chemicals, for Messrs. Schimmel & Co. (Semi-Annual Report, Oct., 1893, p. 67; Bericht, October, 1893, p. 64) have found it to be the chief constituent of the so-called "Artificial Musk" and "Tonquinol," and to be contained in the following amounts in the preparations here enumerated:

Cumarol consists of about	30 per cent. Cumarin. 70 per cent. Antifebrin.
Heliotrop consists of about	25 per cent. Heliotropin. 75 per cent. Antifebrin.
Bigarol consists of about	15 per cent. Nerolin. 85 per cent. Antifebrin.
Irisol	2.5 per cent. Oil of Orris. 97.5 per cent. Antifebrin.
Ambrain	15 per cent. Cumarin. 85 per cent. Antifebrin. And traces of another odorous body.

Conversion of Eugenol into Isoeugenol.—F. Tirmann.—This molecular rearrangement is dependent on the temperature to which the liquid is exposed, and not on the nature of the solvent employed. The conditions most favorable to the conversion of eugenol into isoeugenol have been already described by the author.—Ber. d. Chem. Ges., 1894, 2580.

German Rose-Geraniol.—This product is produced by distilling one kilo of geraniol over 500 kilos of fresh roses. Rose-geraniol, so prepared, can hardly be distinguished in aroma from pure rose oil. It is not only adapted for fine toilet soaps, but for all goods in the manufacture of which rose oil is employed.—Schimmel's Report, Oct., 1894.

Geraniol from Citronella Oil.—According to the process patented by Schimmel & Co., geraniol is prepared from oil of citronella as follows: Agitate together 100 kgm. of citronella oil with from 20 to 40 kgm. of concentrated solution of sodium bisulphite. After cooling, separate the oil from the separated bisulphite compound and heat to the boiling point the former with 5 kgm. of potassium hydrate dissolved in 25 kgm. of alcohol. Distill off the alcohol and then drive off the oil by means of steam. The geraniol obtained is finally purified by fractionation.—Ibid.

Heliotropin.—Helbing and Passmore mention in the Pharm. Zeit., that 37° C. is generally considered to be the melting point of heliotropin or piperonal, but they find that the pure substance melts at 36.1° C., and this, in fact, is what the best commercial samples give. Absence of vanillin and

benzoic acid from piperonal may be proved by rubbing 1 grain with 1 dram of distilled water, adding a little ferric chloride, when no green or bluish color should be produced. Heated with potash solution and a few drops of chloroform, no isonitril odor should be produced, showing the absence of acetanilid. The authors also provide for the absence of non-aldehydic bodies by shaking 1 grain of the heliotropin with a cold saturated solution of potassium sulphite, when the heliotropin dissolves, but in a short time crystallizes out as a double salt of piperonal. The solution is then shaken with ether, the latter washed with water, and evaporated, when there should be no residue.—Chem. Drug., 1895, 797.

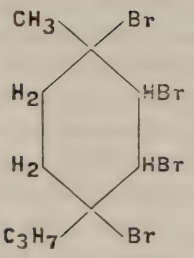
Constitution of Licareol.—P. Barbier and L. Bouveault.—When licareol is gradually mixed with sufficient chromic acid mixture to yield two atoms of oxygen for each molecule of the alcohol, it yields acetone, licaraldehyde or licarhodal, a methyl-heptylene ketone, acetic and formic acids, and methylheptyleneketonecarboxylic acid. With an excess of boiling chromic acid mixture, the products are formic and acetic acids and terebic acid.—Compt. rend., 1894, 1208.

The Aldehyde from Oil of Lemon Grass—P. Barbier.—When geranaldehyde is treated with chromic acid mixture at a low temperature, it yields formic and acetic acids and a methylhexyleneketonecarboxylic acid, $C_8H_3O.COOH$, which yields iodoform when mixed with potassium iodide and sodium hypobromite. This acid would seem to be identical with the oily acid obtained by Tiemann and Semmler; which yielded methyl hexylene ketone when distilled. When oxidized by means of boiling chromic acid mixture, geranaldehyde yields carbonic anhydride, acetone, acetic acid, and terebic acid, $C_7H_{12}O_5$. When boiled with three times its weight of glacial acetic acid for twenty-four hours, geranaldehyde is converted into cymene. It would follow from these reactions that geranaldehyde has the constitution $CH_2.CMeCH_2.CH_2.C.(COH):CMe_2$, and not that ascribed to it by Tiemann and Semmler. Its conversion into cymene can be explained by assuming that the acetic acid first acts as a hydrating and afterwards as a dehydrating agent.—Compt. rend., 1894, 1050.

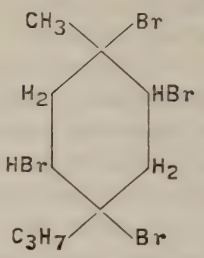
Constitution of Limonene.—Wallach has determined the constitution of limonene from the following considerations: Limonene reacts with bromine, forming limonene tetrabromide, which is decomposed by sodium methylate thus:

$$C_{10}H_{16}Br_4 + 3NaOCH_3 = C_{10}H_{14}BrOCH_3 + 3NaBr + 2CH_3OH.$$

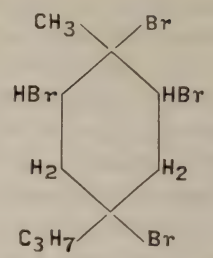
The product can be made to yield the methyl ether of carvol by treatment with silver acetate and acetic acid, and by treatment with hydrobromic acid dipentene tetrabromide results. Since carvol and dipentene can be obtained from limonene tetrabromide, that compound must have one of the three following formulas:



I.



II.



III.

The third is considered an unlikely configuration from analogy. By acting on I. with sodium methylate, no product could result which would yield carvol or dipentene derivatives on treatment with silver acetate or hydrobromic acid. But II. would yield the ether, and is capable of forming carvol ether and dipentene tetrabromide. Now terpineol yields a tribromide of known composition, and the three bromine atoms in its formula are in the same position as those presupposed for limonene tetrabromide, whilst the compound yields carvol ether by proper treatment, identical with carvol ether obtained from limonene. Thus the formulas for limonene tetrabromide and limonene are confirmed.—Ann. der Chem., 281, p. 127.

Oxidation of Menthone.—O. Manasse and H. Rupe.—β-methyladepic acid is produced almost quantitatively by the oxidation of menthone with dilute potassium permanganate solution at ordinary temperatures; it can be purified by precipitation from benzene by means of light petroleum, and melts at 88.°5–89°.—Ber. de Chem. Ges., 1894, 1818.

The Menthol Group.—L. C. Urban and E. Kremers.—The rotation of menthene is now given as $[a]_D = +31.83°$ (instead of $+26.40°$), and of the nitrosochloride, melting at 113°, as $[a]_D = +13.76°$. An inactive nitrosochloride melting at 128° has also been obtained. Menthene nitrosate $C_{10}H_{18}N_2O_4$, melts at 98°, and is optically inactive. Menthene introsobenzylamine, $NO.C_{10}H_{18}.NH.C_7H_7$, from the nitrosate or nitrosochloride, melts at 107°, and is optically inactive. No piperidine base could be obtained, the alkaloid acting on the nitrosochloride like an alkali, and causing the separation of hydrogen chloride. Nitrosomenthene, produced by the action of alcoholic potash on the nitrosochloride or nitrate, yields, on sublimation, colorless needles, is volatile in steam, melts at 67°, and is optically inactive. On reduction, it yields an amido-compound, which, with the diazo-reaction, gives an unsaturated secondary alcohol, $C_{10}H_{18}O$, boiling at 210–215°. The amido-compound, which is, therefore, probably $C_{10}H_{17}.NH_2$, rather than the saturated amine, $C_{10}H_{19}.NH_2$, as anticipated, is being further investigated. In preparing the amine, small quantities of an inactive menthene, boiling at 204–206°, and volatile in steam, were produced. This yields an oxime, crystallizing in needles, melting at 82°, and giving a crystalline hydrochloride. The menthene, on reduction by

Beckmann's method, appears to give menthol, but the latter could not be fully identified. Nitrosomenthene is comparatively stable towards sulphuric acid, but with hydrochloric acid it yields an inactive ketone, $C_{10}H_{16}O$, a colorless oil of peppermint odor, boiling at 210–212°, and having a sp. gr. = 0.9150 at 20°. When the ketone is treated with hydroxylamine, nitrosomenthene is re-formed, a proof that the latter is a true oxime. The authors also discuss the bearings of recent work on the constitution of the menthol group.—Amer. Chem. Jour., 1894, 395.

Reuniol, a New Terpene Alcohol.—A. Hesse.—This strangely-named compound is a product of the geranium oil obtained from the French colony, Reunion, formerly known as Bourbon. Its composition is $C_{10}H_{18}O$, its boiling point is 225.5°–226°, its specific gravity (at 20°) is 0.865, and its optical rotation in a stratum of 100 Mm. + 1° 45′.—Jour. f. prakt. Chem., 1894, 472.

Diisosafrole and Cubebin.—A. Angeli and P. Mole.—Diisosafrole $(C_{10}H_{10}O_2)_2$, is prepared by heating isosafrole with a saturated alcoholic solution of hydrogen chloride at 160° C. in closed tubes. It crystallizes in thin, white needles, sparingly soluble in cold alcohol; it melts at 145° C., and is found, by cryoscopic determinations, to have the molecular composition indicated above. The authors were unable to prepare Weidel's tribromocubebin, but obtained dibromocubebin, $C_{10}H_8Br_2O_2$, by direct bromination of cubebin. The new derivative forms small, white crystals melting at 229° C. Isosafrole and cubebin are undoubtedly very nearly related, and the authors have undertaken their investigation with the object of throwing some light on the constitution of cubebin.—Gazzetta, 1894, 127; Jour. Chem. Soc., 1895, 24.

Examination of Suberon.—W. Markownikoff.—Suberon is a pale yellow liquid, having a somewhat impure odor of menthol. Its boiling point is at 178°–179° C. (at an atmospheric pressure of 750 Mm.) Its sp. gr. = 0.949. It dissolves readily in various solvents, but it is almost insoluble in water, although hygroscopic. Its composition corresponds to the formula $C_{17}H_{12}O$.—Jour. f. prakt. Chem., vol., xlix., Nos. 10 and 11.

Tanacetone and Its Relation to Thujone.—F. W. Semmler.—Tanacetone, $\left.\begin{matrix} CHPr.CH.CO \\ | \quad\quad | \\ CH_2—CH.CHMe \end{matrix}\right\}$ when heated at 282° for 24 hours in a sealed tube, is converted into a product which boils at 220°–235°, and when heated with hydroxylamine, yields an oxime, which melts at 92°–93°. The oxime, when warmed with dilute sulphuric acid, yields pure carvotanacetone, $CPr\begin{matrix} \diagup CH.C(OH) \\ \diagdown CH_2—CH_2 \end{matrix}\!\!>CMe$. This boils at 228° C., and has the sp. gr. = 0.9373 at 17° C. $[n]_D = 1.4835$. It has an odor closely resembling that of carvone. Tetrahydrocarvotanacetone, $C_{10}H_{20}O$, obtained by reducing carvotanacetone with sodium and alcohol, boils at 219°–220°, has a sp. gr.

of 0.914 at 17° C., and $[n]_D = 1.4685$. It has an odor resembling that of terpineol, and in proportion closely resembles hexahydro-oxycymene, obtained by Wallach from terpineol. Both tanacetone and absinthone, which the author believes are identical, combine with sodium hydrogen sulphite, and yield solid oximes; whereas thujone and salvone do not, and they also differ from tanacetone in physical properties.—Ber. d. Chem. Ges., 1894, 895.

Terebene.—Martindale claims that, chemically, it consists of camphene, cymene, borneol and terpinene, the last named of which is alleged to be the active or toxic constituent of terebene. The U. S. P., 1890, states that terebene consists chiefly of pinene, and contains not more than very small proportions of terpinene and dipentene. F. B. Power (Proc., 1894, 1168) states that it consists chiefly of the hydrocarbons dipentene and terpinene, with some cymene and camphene. For the internal administration of terebene other than inhalations of vaporized terebene, Martindale recommends the conventional method of giving the terebene in sugar. A much better way, in England's opinion, is to admix the terebene with an equal volume of olive oil, and emulsify with powdered acacia, sugar and water, flavoring with oil of gaultheria; each teaspoonful to contain 5 minims of terebene.—Amer. Jour. Pharm., 1895, 330.

Fixed Oils.

The Iodine Absorption of Some of the Rarer Fatty Oils.—J. A. Roelofsen.—The iodine absorption figures for about 50 vegetable and animal oils, mostly rare and previously undetermined, from trustworthy sources, were determined by the Hübl method, as described in "Allen's Commercial analysis," and the results and description of the oils are given in the paper.—Amer. Chem. Jour., 1894, 467.

The Clarification of Oils.—Many methods have been proposed for this purpose, including filtration alone or through animal charcoal or porous solids, precipitation with tannic acid, acetate of lead, plaster of Paris, albumen, gelatine, and other agents. Les Corps Gras Industriels recommends the use of cellulose and asbestos, with which filters are made similar to those employed for beer, and with which beautifully clear oils can be obtained. The best results are obtained by first clarifying by decantation, and finally, filtering through cellulose; centrifugal machines also give excellent results.—Chem. Drug., 1894, 740.

Preservation of Oils.—It is known that impurities and moisture are the principal causes of the deterioration of fatty oils. As a means of preservation sterilizing is poorly adapted, since not only does heating change the flavor of culinary oils, but heat itself is a principal factor leading to decomposition. The addition of antiseptics is excluded for various obvious reasons. Repeated filtration of oils exerts a decidedly beneficial influence on

the lasting qualities of oils. In a paper in the Corps Gras Industriel, A. M. Villon reports the results of experiments with the use of a product of certain Algæ sold as algosin, a mucilaginous substance resembling tragacanth. This body possesses the property of readily forming salts with alkalies which assume a gelatinous form. A concentrated solution of this algosin agitated with the raw oil completely destroys all foreign substances and renders the oil unchangeable. After allowing to settle for twenty-four hours the oil is decanted and filtered. A single treatment suffices to render a fresh oil permanent for years, so that, even if freely exposed to the air, it will not become rancid or change its odor or taste. In proof of this extraordinary assertion the author appends some experimental data, the samples in question having been exposed without any caution whatsoever in open vessels during fifteen months, at a temperature ranging between 18° and 22° C.

Olive Oil.	Treated. Acidity.	Natural. Acidity.
Originally	0.01 per cent.	1.23 per cent.
After 1 month	0.01 "	1.34 "
" 2 months	0.01 "	1.79 "
" 3 "	0.02 "	2.86 "
" 6 "	0.02 "	3.43 "
" 12 "	0 03 "	4.91 "
" 15 "	0.03 "	6.13 "

Sesame Oil.	Treated. Acidity.	Natural. Acidity.
Originally	0.00 per cent.	1.25 per cent.
After 1 month	0.00 "	1.32 "
" 2 months	0.01 "	1.49 "
" 3 "	0.01 "	2.01 "
" 6 "	0.02 "	3.88 "
" 12 "	0.02 "	5.40 "
" 15 "	0.03 "	6.80 "

Peanut Oil.	Treated. Acidity.	Natural. Acidity.
Originally	0.01 per cent.	2.55 per cent.
After 1 month	0.01 "	3.61 "
" 2 months	0.01 "	4.22 "
" 3 "	0.02 "	4.80 "
" 6 "	0.02 "	6.99 "
" 12 "	0.02 "	10.18 "
" 15 "	0.02 "	15.71 "

—West. Drug., 1895, 60.

Turbidity Temperature of Oils and Fats with Glacial Acetic Acid.—E. W. T. Jones having noticed that even the presence of 0.2 per cent. of water in the acetic acid makes a serious difference in the turbidity temperature, proposes to check the acid with normal butter fat. To the best gla-

cial acetic acid, water is carefully added, until the turbidity temperature with the normal butter fat comes exactly at 60° C.; the acid is then reserved for the testing. It is, almost, most important that the relative proportions of acid and fat should be strictly adhered to. The author uses special pipettes, a narrow one, holding 3 Gm. of water at 15.5° for the acid, and wider ones with wider orifices, delivering 3 Gm of water for the fat. All oils or fats are measured at 50°.—Analyst, 1894, 151; Jour. Chem. Soc., 1894, 490.

Estimation of Small Quantities of Chlorine in Fats—R. Benedikt and H. Zikes.—A tube made of hard glass, 100–110 Cm. long and 11–12 Mm. wide, is drawn out funnel-shaped at one end, and bent at an angle of 45° upwards. The funnel is provided with a doubly perforated india-rubber cork, through which passes a narrow bent tube for admitting air or carbonic anhydride, whilst the other hole admits a tube connected with a calibrated 100 Cc. reservoir containing the oil. The tube is made ready for use by introducing in the middle two separate 15–20 Cm. layers of lime, held together by plugs of asbestos. The empty space between the bend and the first plug of asbestos is filled up with broken pieces of porcelain. The tube is now laid in the combustion furnace, which must extend slightly beyond the second layer of lime. The other opening is closed with a cork, through which passes a bent tube connected with a test tube to collect any tar; another narrow tube carries off the gases, which must be lighted, and which indicate the progress of the combustion. When the lime is red hot the oil is very slowly admitted, a very slow current of carbonic anhydride being also passed through. When, after 3 to 5 hours, about 25–30 Gm. of oil has entered the tube, the supply is stopped, and when the flame has gone out the tube is allowed to cool; it is then emptied, and the contents examined for chlorine in the usual manner. The test analyses are very satisfactory.—Chem. Zeit., 1894. 640.

Sulphur in Oils.—W. Fox and D. G. Riddick.—The following table gives the mean amounts of sulphur in grains per gallon obtained by the authors from various oils by burning them by means of a floating wick, such as is used for night-lights, and condensing the vapors given off in a sulphur apparatus in the same way as sulphur is determined in coal-gas. These oils, which do not burn alone, were mixed with a sufficient quantity of sperm or cocoa-nut oil to make them do so without smoking:

Name of Oil.	Sulphur.
Pure Brown Rape	14.2
Ordinary Brown Rape	17.4
Refined Brown Rape, with sulphuric acid	16.8
" " " with Fuller's earth	10.0
Ravison Rape	19.1
Jamba Rape	113.0
Linseed, La Plata	trace

Sperm, pure	2.3
" Bottlenose	3.1
Cotton-seed	trace
Cocoa-nut ordinary	3.7
Ground-nut	none
Neat's-foot	4.7
Olive	none
Cod	5.8
Russian Mineral, 0.908	20.5
Russian Burning Mineral	10.3
American Burning Mineral	16.3
American Burning Water White Mineral	8.1
American Burning Safety Mineral	14.0
Scotch Mineral for Gas-making	49.8

—Chem. News, 1895, 296.

Alligator Oil.—The curious interdependence of commercial products may, if the petroleum supply ever runs far below the demand, result in the use of alligator oil. The extraction of oil from alligators in Brazil is an important industry. The oil makes a good illuminant and is used to a great extent in the manufacture of liniments and ointments. The oil extracted from crocodiles makes a superior leather dressing. It is in great demand in the Orient, and there are indications that it is to be introduced into England.—Amer. Drug. and Pharm. Rec., 1894.

Fixed Oil of Carapa Guianensis.—E. H. Gane.—The oil is liquid at temperatures above 20° C., but solidifies below that point to a creamy consistence, and if strongly cooled hardens considerably, but leaves a liquid oily portion intermingled with the solid lumps. The liquid portion is principally olein. The oil has a peculiar, somewhat rancid odor, and a nauseous bitter taste. The specific gravity at 15° C. is 0.923. On warming with water acidulated with acetic acid the bitter principle is removed from the oil, and the aqueous solution precipitates with the usual alkaloidal reagents, showing that the bitterness is due to an alkaloid or alkaloids.—Pharm. Jour. Trans., 1895, 1150.

On Triricinoleine, its Ethers and its Synthesis—Artificial Castor Oil.—P. Juillard.—This synthesis has been effected by heating ricinic acid with glycerin, keeping closely within certain limits of temperature.—Bull. Soc. Chim., 1895, No. 5.

Castor Oil Comfits.—A writer suggests the manufacture of a castor oil comfit, which will greatly facilitate the administration of that remedy to children. The process consists in cooking crude or refined sugar until it is on the point of candying or crystallizing. This can be learned by the removal of a little from time to time, and letting a drop fall on a cold surface. When this point has been reached, remove from the fire and stir in the oil, until a homogeneous mixture is obtained. The mass cast into sticks, or cut into lozenges, is put up in packages sufficient for one, two,

or more doses, as required. It is claimed that the taste is similar to the well-known "butter scotch," and that the comfit acts as an effective laxative, or purge, as desired.—Ibid.

Sulphur in Castor Oil.—A specimen of castor oil having been observed to blacken the silver spoon from which it was administered, an examination showed the presence of a considerable proportion of sulphur. The oil had been extracted by means of carbon bisulphide instead of by pressure.—Apoth. Zeit., 1894; Ibid.

Castor Oil.—E. J. Parro proposes for insertion in the B. P. Renard's test—the oil should not yield the characteristic reaction for rosin oil. The gravity should lie between .957 and .967 at 60° F. The oil should dissolve in an equal measure of glacial acetic acid at ordinary temperatures. The solubility in absolute alcohol is useful, but the solubility in rectified spirit is not so good.—Brit. and Col. Drug., 1894, 282.

Coco-Nut Oil.—An odorless and tasteless coco-nut oil is obtained by melting the oil and passing steam through the same in an atmosphere of an inert gas like CO_2, until all of the odorous principles are removed. Then allow the product to cool in an atmosphere of the gas used, and obtain the oil, which is then odorless, and will not become rancid.—Pharm. Centralh., 1895, 549.

New Test for Cotton-Seed Oil.—It is well known that Becchi's reaction (alcoholic solution of silver nitrate reduced by cotton oil) does not always take place with cotton-seed oil, and it is probably an impurity which occurs in most oils that produces reaction. Gantter suggests the following as a safer and more reliable reaction: Into a test tube 1 Cc. of the oil or fat to be tested is poured. It should be quite dry. 10 Cc. of petroleum ether are then added, and into the solution one drop of strong H_2SO_4 is poured. If there is any cotton-seed oil present, a brown color, becoming black if there is sufficient of the adulterant present, results. Arachis oil is the only oil which the author records as behaving similarly, and the color in this case is not so intense.—Zeitsch. f. anal. Chem., 1894.

Estimation of Sulphur in Earth Nut Oil.—H. Kast and F. Lagai.—0.5 to 1 Gm. of substance is mixed with 100 Cc. of fuming nitric acid, and 10 Gm. of potassium chlorate is gradually added. After 1–2 hours at the ordinary temperature, the mixture is heated carefully on the sand-bath for 12–15 hours, until oily drops are no longer visible. It is then repeatedly evaporated to dryness with strong hydrochloric acid, filtered from resin, and the sulphuric acid in the filtrate estimated as usual. Carius' method gives low results.—Zeit. f. anal. Chem., 1894, 470.

Limeseed Oil.—The Vossische Zeitung, in an article dealing with this oil, says: "More than a hundred years ago the importance of the fine sweet oil made from the seeds of lime trees was mentioned, but no attempts were made to procure this oil on a large scale, and later the matter

was forgotten. A few years ago limeseed oil was discovered for the second time, and the experience then acquired justified great importance being ascribed to the industry. Lime trees blossom so abundantly every spring and produce such a multitude of seeds, which fall to the ground in autumn, that it would be easy to collect large quantities under every lime-tree avenue. The seeds possess 58 per cent. of oil, and are in this scarcely surpassed by any other seed; only slightly by the para-nut, the cocoanut, and the hazelnut. The percentage of other important oil-yielding seeds is far less. The oil of the lime-tree seed, which can be pressed in all sorts of ways, is distinguished by a beautiful clear color and fine taste, has not a trace of bitterness or aromatic flavor, and may be justly compared to the finest olive oil. It never becomes rancid, and can be left exposed to the air in open vessels without the slightest change in taste or state of preservation. It is an oil that does not dry, and has not the least inclination to combine with oxygen. It is, therefore, not only valuable as a food oil, but also for industrial appliances. It does not freeze at any degree of cold temperature known to us, and is not changed at even 21° C. It is remarkable that this valuable oil-seed has not been more utilized, for it would not be difficult to find the proper places for obtaining the seed in quantity, and collecting it cheaply. The lime tree produces the same enormous quantity of seed almost every year, and, therefore, there would be no stoppage in the regular manufacture of the oil."—Brit. and Col. Drug., 1894, 411.

Analysis of Linseed Oil.—F. Filsinger recommends using the polariscope for the detection of rosin in linseed oil. Oil prepared from German or Indian seed is optically quite inactive, whilst rosin oils have a strongly right-handed polarization. When making an iodine absorption test, the Hübl solution should be allowed to act for 20 hours.—Chem. Zeit., 1894, 1005.

Adulterated Linseed Oil.—It is said that there is at present some quantity of linseed oil on the market adulterated with liver and blubber oils. To detect this admixture, ten parts of the oil and three of commercial nitric acid are mixed thoroughly in the test-tube, and the two layers allowed to separate. If the fish oil be present, the oily layer is dark brown to black in color, while the acid has a deep orange-red color. If, however, the oil be pure, the oily layer is only a dirty green and the acid a golden yellow color.—Amer. Drug. and Pharm. Rec., 1895, 308.

Neatsfoot Oil.—E. J. Parry examined six commercial samples and found that not one of the samples was genuine.—Chem. and Drug., 1894, 322.

Differentiation of Olive and Sesame Oils.—Franz Musseb gives the following: Into a test-tube of 15 Cc. capacity, put 8 to 10 Gm. of the oil to be tested, and add 10 Cgm. of dried phosphorus. Close the tube and

dissolve the phosphorus, by the aid of heat, in a water-bath. Let cool, replace the cork in the test-tube with a plug of lint cotton, and set aside in a place where the oil will not congeal. At the end of 24 hours, if the oil is pure, whitish opaque streaks will appear through the body of the same, which, in another day, will settle, and form a transparent yellowish-brown ring or cup, covering the bottom and sides of the test-tube. If oil of sesame be present to the amount of 10 per cent. at the end of the first day, the white streaks will form, apparently as in the pure oil, but closer observation will detect a decided tinge of yellow among them, and at the end of the second day all will have become yellow, which subsequently becomes, brown. The rapidity of the color change depends directly upon the amount of adulterant present. If, for instance, there be 50 per cent. of sesame oil present, a deep brown ring will show itself within from 24 to 48 hours. The author gives, as a further test, the following: Into a tube of the phosphorized oil let fall a single drop of wood tar, and add 2 Cc. of ammonia. The tube is then agitated, and if the oil be pure no color change will be noted; but if sesame oil be present, a brownish color develops, the depth of which depends upon the amount of adulterant.—Pharm. Central.—Nat. Drug., 1894, 360.

Olive-Oil Making in South Italy.—A full-page drawing of an Italian olive-mill is given—a stone wheel in a mortar-like trough—worked by several personages. It is explained that the olives are first gathered and then stored up in heaps till they are matured, *i. e.*, turned a brownish-black; they are then placed in the mill, called the "pontana," which consists of a large circular trough, in which revolves the mill-stone, which is worked by about three or four people. When the olives are reduced to a crushed mass of oil and pulp, they are taken out and placed in the press and squeezed, the oil running out into a large receptacle below. After the oil has been thoroughly squeezed out, it has to be removed from the large receptacle and placed in stone cases or jars. This is a most serious business, for during the process, which is begun by the man who has to ladle out the oil making the sign of the cross over it, no one is allowed to speak, and should any one venture to make a remark he is promptly silenced.—The Graphic; Chem. Drug., 1895, 586.

Tests for Olive Oil.—E. J. Parry (Brit. and Col. Drug., 1894, 282) suggests the following tests: (1) Its gravity should lie between .913 and .918 at 60° F. (2) It should not yield the characteristic reaction of Becchi with alcoholic solution of nitrate of silver. (3) It should not contain more than 5 per cent. of free acid, calculated as oleic acid, when titrated with standard solution of potash; the oil to be dissolved or agitated with alcohol when being titrated, and phenolphthalein to be used as an indicator. (4) Conroy's nitric acid test might also be included with advantage.

Some Analytical Constants of Seal Oil.—A. C. Chapman and J. V. Rolfe examined 7 samples and recorded the specific gravity, insoluble fatty acids, with their melting points, iodine and bromine absorption, total acid number, saponification equivalent, free fatty acids, and Reichert's test.—Chem. News, 1894, 1.

Adulterated Sperm Oil.—E. J. Parry (Chem. and Drug., 1895, 124), says the viscosity is a test of extreme value in the case of sperm oil, since it does not vary with increase of temperature nearly so much as that of most other oils does. It is proper, therefore, to determine this figure for several temperatures, say at 100°, 120° and 140° F. Boverton Redwood's viscometer is the most convenient and most frequently used instrument for this purpose. The amount of free acid, as determined by the titration of the sample with standard solution of potash, is of importance, and should never exceed 1, or at the most, 2 per cent. The amount of iodine absorbed (Hübl's test) the rise of temperature with sulphuric acid (Maumené's test), and the temperature of solubility of the oil in an equal volume of glacial acetic acid (Valenta's test) are all of extreme value when considered in conjunction with the other part of the examination.

If, however, the absence of mineral and unsaponifiable oil can be assured by the examination, the most useful and trustworthy results are obtained by the saponification of the oil with alcoholic solution of potash. While none of the other animal or vegetable oils, with the exception of some of those from closely allied species, yields after saponification, more than 2 per cent. of matter soluble in ether, since they give practically nothing but fatty acids and glycerin, the former of which combines with the potash and the latter remains dissolved in the water, and the small amount of foreign matter forms the unsaponifiable residue dissolved in ether, the oil from the sperm whale gives widely different products, and, instead of glycerin, yields a higher fatty alcohol, insoluble in water and soluble in ether. The result is, that 40 per cent. is dissolved by the ether after saponification. Of course, a judicious mixture, say, colza oil and hydrocarbon oil, would give this result; but the absence of hydrocarbon oil may be established by the other tests. In addition, the residue extracted with ether may be treated with strong oil of vitriol, when the genuine substance will be destroyed, while paraffin will be practically unacted upon.

Turkey-red Oil.—P. Juillard continues his previous work on the action of sulphuric acid on castor oil and on ricinoleic acid.—Bull. Soc. Chim., 1894, 280.

Carbon Compounds

Manufacture of Acetone.—E. R. Squibb (Ephemeris, Jan., 1895, 1653) has made acetone directly from acetic acid by a continuous process. The author prosecuted his experiments along the line of the decomposition of acetic acid into acetone, as outlined in "Gmelin's Handbook of Chem-

istry," edition of 1853. One of the main difficulties to overcome was the keeping of the vapor of acetic acid at a uniform temperature, which is essential, since the results of decomposition vary with the temperature. This end was accomplished by carefully regulating the influx of the acid vapor into the still and by insuring the uniform heating of the still contents. Both these objects are accomplished in the apparatus described by him. It practically consists of a small flask arranged as a still, and from this by a gas burner a constant current of acetic acid vapor could be produced at any desired rate. A condensation apparatus consisting of a number of bottles. Between these two, the distillation and condensation apparatus, there was a decomposing apparatus consisting of a wrought iron tube contracted at the ends to central, hollow journals free to revolve, and supported in the center of a drain pipe furnace and connected at one end with the vapor supply and at the other with the condensers by air tight glands or "stuffing boxes." The ends were provided with charging and discharging openings which could be closed air-tight, and the still was revolved slowly by means of a pulley on one end of the hollow shaft. This rotary still was driven at the rate of three to six revolutions per minute by a small water motor, and was found to heat with great equability as it revolved over the burners.

Inside of the still, at equal distances apart on the periphery, five L-shaped, longitudinal strips of sheet iron were riveted. These were necessary to prevent the charge from sliding round as the iron became smooth, and they were found to carry the charge round, turn it over and mix it most effectively at each revolution. Thus, while by the revolutions over the source of heating the shell was heated very uniformly, this continuous moving and turning over of the contents must bring all parts of the charge, solids and vapors alike, in successive contact with the hot surfaces and the cooler atmosphere of the still, and thus secure a fair degree of equable heating.

The still being about one-third filled with the solid charge and slowly rotated, the charge occupies principally, not the bottom of the still directly over the fire, but the ascending third which has just been over the fire. Then, as the charge is carried up, the superficial cooler portion, too deep to be held by the longitudinal shelves, slides back onto the hot surface below, while the portion carried on by the shelves falls back, shelf by shelf, from contact with the hot shell through the atmosphere of vapor, onto the cooler portions below, to be mixed and carried up again in a similar order. At the same time the whole atmosphere of the still is filled with dust which becomes very fine, and very largely multiplies the surfaces of contact with the vapor, for decomposition, while the vapors pass slowly and uniformly and with a minimum of friction to the exit at the condenser end.

The Quality of the Acetone Yielded.—The dilute acetone from this process is fairly good and clean, and is colorless except for the action of the

free acid contained on the iron tubing. With the free acid the sp. gr. by hydrometer varies between 0.93 and 0.97. No part of the distillate has more than a thin film of oil on the surface, too small to be measured, and this oily surface is only in the first flask with the acid water. On further dilution of the ice bath distillate, it is rendered opalescent for a minute or two and then becomes again transparent.

This distillate (undiluted) is a good solvent for many substances, and is probably pure enough for the manufacture of chloroform.

When allowed to stand some days upon caustic lime and then poured off and rectified, it is much improved in character and strength, and is then adapted to a still larger number of uses, and is perhaps better adapted to the manufacture of chloroform.

Contraction of Aqueous Solutions of Acetone.—K. T. P. McElroy..—The acetone used in the experiments was bought as pure, and was further purified by boiling for three days over calcium chloride, and redistilling. The fraction finally used boiled at 56.4°. The method employed was to weigh a flask, add water, weigh, add acetone, re-weigh, shake and determine the specific gravity, first at 20°C., and then, without refilling the bottle, at 25° C. The weight of the mixture, divided by its specific gravity, gave the actual volume of the mixture at that tempezature. The difference between this figure and that representing the sum of the volumes of the unmixed liquids, when divided by the latter figure, gave the percentage of contraction. The results are tabulated. The contractions, which do not materially vary from each other at 20° C. or 25° C. gradually increase with the amount of water until this reaches 49.9 per cent. After this there is a steady decrease. The highest and lowest percentages of contraction are respectively, 4.089 (with 49.9 per cent. of water) and 0.86[illegible] (with 4.99 per cent. of water).—Jour. Amer. Chem. Soc., 1894, 618

Acetoacetanilid.—L. Knorr and B. Reuter.—Acetoacetanilid is prepared by the interaction of ethylic acetoacetate and aniline at 130°–140° and crystallizes from water in colorless plates melting at 85° C. The yield is more than one-third of the theoretical.—Ber. d. Chem. Ges., 1894, 1169.

Method for Determining the Percentage of Alcohol.—J. Barker-Smith (Jour. de Pharm. d'Anvers, 1895, 121) recommends a method depending on the well-known fact that alcohol and alcoholic liquids produce an elevation of temperature when mixed with water. He employs one dram each of the liquid to be examined and of water, both at the same temperature, and mixes them quickly in a cylindrical receptacle ; the latter should be provided with a cork, and should not be touched by the fingers. The temperature of this mixture is now taken, and by referring to a table showing the temperatures obtained by mixing the same quantity of water with alcoholic liquids of known strength, the percentage of alcohol of the liquid in question can readily be ascertained. This thermometric method

would not do where very exact measurements are wanted, for it is not sensitive to less than about 5 per cent. of alcohol; it would, therefore, not answer for testing wines containing 10 per cent. or less of alcohol. One point raised in its favor is that substances in solution do not interfere much with the test. The above is a convenient and rapid process for determining the alcoholic strength of liquids containing a large percentage of alcohol, such as whiskies, brandies, tinctures, fluid extracts, menstrua, etc.

Purification of Alcohols, etc—E. Maumené purifies alcohol, sugars and other organic bodies by the action of potassium permanganate. If a liter of impure alcohol be agitated with 2 Cc. or 3 Cc. of aqueous permanganate solution, oxides of manganese are precipitated, the impurities are oxidized, and any bad taste disappears, and after standing awhile a clear liquid may be decanted. The same process is recommended for purifying red and white wines, which are said to lose but little of their color or bouquet, as well as for refining sugars and improving potable waters.—Comp. rend., cxix., 1014.

Alcohol in Crystals.—F. Roques has sought to prepare examples of salts containing alcohol in lieu of water of crystallization. Such a compound strontium bromide with alcohol, was recently described by Fonzes-Diacon and Roques now describes a similar preparation of calcium bromide. It forms fine tabular, rhomboidal crystals of the composition $CaBr_2.3C_2H_6O$, corresponding with the variety of calcium chloride described by Heindl—$CaCl_2.3C_2H_6O$. When the crystals are calcined the following decomposition occurs:

$$CaBr_2 + C_2H_6O = CaO + C_2H_5Br + HBr.$$

ethyl bromide and hydrobromic acid being formed. They are also very hygroscopic, and when brought in contact with a flame swell up and burn.—Jour. de Pharm. (6), i., 301, through Pharm. Jour. and Trans.

To Deodorize Used Alcohol.—E. A. Kadel (Chem. Ztg., 1894, 305) recommends the following procedure: The alcohol is first treated with caustic soda, using 30 Gm. to about 5 litres. Allow this to stand for 2 to 5 days and distil. The portion which first passes over must be returned to the retort until the odor changes or is lost. Generally, the alcohol retains an empyreumatic or soap-like odor, of which it may be deprived by distilling over potassium-permanganate, using about 15 Gm. of the latter to 5 litres of the alcohol. The distillate thus obtained is said to be, as a rule, sufficiently pure for manufacturing purposes. In case a further purification should seem desirable, distil once more over permanganate, and filter through animal charcoal; or, in absence of the latter, add to the distillate, after the second treatment, a little water, and subject the whole to one more distillation.

Separation and Estimation of Small Quantities of Methylic and Ethylic

Alcohols.—L. Prunier.—After the isolated alcohol liquid has been treated with concentrated hydriodic acid to convert the alcohols into the corresponding haloid salts, the liquid is shaken with pure chloroform; or it may be distilled, and the first portions condensed in a receiver containing chloroform. After removing free acid by shaking with aqueous potash, the chloroform is agitated with a solution of silver nitrate and a little moist silver oxide, which, after some time, will cause a precipitate of silver iodide. This is washed first with ammonia, and then with nitric acid, and weighed. If ethylic alcohol alone be present, its amount may be at once calculated from the weight of the silver iodide; but if both alcohols are present, their total amount must be ascertained from the specific gravity of the distillate, and their respective amounts calculated from the amount of silver iodide obtained.—Jour. Pharm. Chim., 1894, 407.

Detection of Methylated Spirits.—A. Ashby proposes to use a one per cent. solution of sodium nitroprusside for the detection of methylated spirit in tinctures, spirits and other compounds. The solution should be freshly prepared and equal parts of it and the sample, or distillate from the sample under examination, and then a few drops of ammonia are added and the color observed after standing 10 or 15 minutes, by which time the red color will have become fully developed if acetone or some other constituent of wood spirit is present in appreciable quantity.—Pharm. Era, 1895, 136.

Estimation of Oil of Turpentine in Alcohol.—Alcohol containing turpentine will stand more or less dilution with water before a turbidity is produced. The more turpentine is present the less will be the amount of water required. On this fact the author bases his process for a quantitative estimation of turpentine in denatured spirits. 5 Cc. of the sample is put into a test glass and water is added from a burette until a permanent turbidity is produced. 5 Cc. of a 0.5 per cent. solution of turpentine in spirit of the same alcoholic strength as the sample is put into another test glass and also titrated. The mixture which consumes most water is the poorest in turpentine, and the author found that 1.1 Cc. of difference in water is equivalent to 0.25 per cent. of turpentine. The author also found that the turpentine cannot be removed by practical distillation over lime. —J. Perl, in Chem. Zeit., 1894, 1851.

Pentadecylic Alcohol from Palmitic Acid, Preparation of.—L. Panics has prepared pentadecylic alcohol from palmitic acid, by first treating the silver salt with iodine, and then converting the salt, $C_{15}H_{31}.COOC_{15}H_{31}$, thus obtained into the alcohol, $C_{15}H_{31}.OH$.—Monatsh. f. Chem, 1894, 9.

Sugar and Alcohol from Peat.—Verveig obtained sugar and alcohol from peat by heating for 2⅓ hours an equal quantity of peat and 3 per cent. sulphuric acid under steam pressure of nearly two atmospheres. The resulting black, turbid liquid is then saturated with calcium carbonate, filtered, and decolorized with animal charcoal. Part of the sugar obtained

is converted into caramel, the rest fermented with water and yeast at a suitable temperature, and the alcohol obtained by distillation is rectified. The author considers that 1000 kilogms. dry peat will furnish at least 60 liters pure alcohol. The sugar obtained from peat will doubtless never be of any value except as a source for preparing alcohol.—Pharm. Centralh., 1895, 290.

Freezing Points of Mixtures of Alcohol and Water.—R. Pictet's results of the determination of the freezing points of mixtures of ethylic alcohol and water are contained in the following table.

Hydrates.	Sp. gr.	Per cent. alcohol.	Freezing point.
$C_2H_6O + H_2O$	0.8671	71.9	— 51.3°
" $2 H_2O$	0.9047	56.1	— 41.0
" $3 H_2O$	0.7290	46.3	— 33.9
" $4 H_2O$	0.9417	39.0	— 28.7
" $5 H_2O$	0.9512	33.8	— 23.6
" $6 H_2O$	9.9578	29.9	— 18.9
" $7 H_2O$	0.9627	26.7	— 16.0
" $8 H_2O$	0.9662	24.2	— 14.0
" $9 H_2O$	9.9689	22.1	— 12.2
" $10 H_2O$	0.9712	20.3	— 10.6
" $11 H_2O$	0.9732	18.8	— 9.4
" $12 H_2O$	0.9747	17.5	— 8.7
" $13 H_2O$	0.9761	16.4	— 7.5
" $16 H_2O$	0.9793	13.8	— 6.1
" $20 H_2O$	0.9824	11.3	— 5.0
" $35 H_2O$	0.9870	6.8	— 3.0
" $50 H_2O$	0.9916	4.8	— 2.0
" $100 H_2O$	0.9962	2.5	— 1.0

—Compt. rend., 1894, 678.

Boiling Points of Dilute Solutions of Water in Alcohol and in Ether.—C. E. Lineberger gives two tables of the boiling points of alcohol containing various amounts of water under a pressure of 756 Mm., at temperatures about 78.1°, and that of ether under a pressure of 750 Mm. = 34.4°. —Chem. News, 1894, 52.

Researches on the Aldehydes.—It has been long known that rosaniline decolorized by H_2SO_3 is a delicate reagent for aldehydes. This reagent will detect the minutest quantity of aldehyde in commercial spirit or acetone. Villiers and Fayolle, during a careful purification of a sample of acetone (which was sold as chemically pure) find that the first portions of the distillate yield the reaction energetically whilst the later ones scarcely do so at all. Hence the reaction is due to an impurity in the acetone more volatile than itself. Acetone prepared by them, and purified by repeated crystallization with sodium bisulphite, did not yield the reaction. It has been suggested that the reagent should be used for the detection of acetone in urine, but of course this is out of the question after these results.

It has also been affirmed, and is still so in most texts books, that the sugars containing the aldehyde group do not react in the ordinary way with rosaniline bisulphite. The authors, however, state that it will distinguish the aldehyde from the ketone sugars. Glucose and galactose, for example, color the reagent, whilst levulose and sorbinose do not. The bioses or saccharoses (cane and milk sugar) do not yield the reaction except after several days standing, when it is due to partial hydrolysis, and the free aldehyde sugar thus formed is responsible for the coloration. These results are quite new, and supply a missing link in the chain of evidence as to the aldehydic nature of some of the sugars.—Comp. Rend., 1894; Brit. and Col. Drug., 1894, 261.

Preparation of Aniline.—A. Wohl.—When writing his previous paper the author was unaware that in 1887 O. N. Witt suggested that in the preparation of naphthylamine ferrous chloride is the real reducing agent, and that the action takes place in accordance with the equations: (1) $6FeCl_2 + C_{10}H_7.NO_2 + H_2O = 3Fe_2Cl_4O + C_{10}H_7.NH_2$; (2) $4Fe_2Cl_4O + 3Fe = Fe_3O_4 + 8FeCl_2$. Against this it is urged that the presence of other salts, such as calcium chloride, which have no reducing action, greatly facilitate the transference of oxygen from the nitro-compound to the iron, and that extremely concentrated solutions of ferrous salts, in absence of alkalies, have little action on nitro-benzene, and none, when the solutions are of the same strength as are employed technically. In the author's opinion the reduction is caused by the finely divided moist metal. Recently prepared ferric hydroxide, like basic ferric chloride, in presence of ferrous chloride, is converted into ferrosoferric oxide by the action of finely-divided iron. Witt's second equation is therefore correct. In a foot-note it is pointed out that dilute, aqueous solutions of nitro-benzene have a remarkably sweet taste.—Ber. d. Chem. Ges., 1894, 1815.

The Benzene Nucleus.—W. Vaubel.—It is evident from the work of Crum, Brown and Gibson, of Schöpff, of P. Fischer and of the author that the carbon atoms in the benzene nucleus which are in the metaposition with regard to each other are more closely related than are those in the ortho-or para-position. No configuration of the benzene molecule which does not take cognisance of the difference between the behavior towards reagents of ortho and para-derivatives on the one hand and of meta-derivatives on the other hand, and of the proximity, as it were, of the meta-positions, can correctly represent the constitution of benzene. It is shown that this formula is in accord with Baeyer's investigation on the reduction products of benzene derivatives, and with the fact that meta-derivatives do not tend to form anhydrides.—Jour. f. prakt. Chem., 1894, 308.

Constitution of Benzene.—J. W. Brühl discusses at length the present views on the constitution of benzene, and concludes that Kekulé's formula, in which three double bonds are supposed to exist in the benzene ring, is

in closer agreement with the fact than Claus' diagonal formula, which is supported by v. Baeyer. The author considers that the thermochemical data for benzene derivatives obtained by Stohmann and supposed to be evidence strongly supporting the views of v. Baeyer, are in complete accordance with Kekulé's benzene formula. Stohmann's and v. Baeyer's works are discussed at length.—Jour. f. prakt. Chem., 1894, 201.

Constitution of Benzene.—A. Claus.—A criticism of the recent paper by Brühl on this subject. The author cannot admit that the evidence adduced in that paper is favorable to Kekulé's formula and at variance with his own formula.—Jour. f. prakt. Chem., 1894, 505.

To Deodorize Benzin.—According to the Pharm. Centralh. (1894, 454), the following method gives satisfactory results: First agitate the benzin frequently during 24 hours with a mixture of 1 part of potassium permanganate, 50 parts of water and 8 parts of sulphuric acid, and after separating treat the benzin with a solution of 1 part of potassium permanganate, 50 parts of water, and 2 parts of caustic potassa in the same manner as above.

Preparation of Bromoform.—P. Fromm.—When calcium hypochlorite (3 mols.) and potassium bromide (6 mols), are allowed to react with acetone (2 mols.), and the product distilled with steam, the yield of bromoform is only one-third of the theoretical, for the calcium hydroxide formed in the reaction decomposes some of the bromoform, forming calcium bromide, water and carbonic oxide. The theoretical yield can be nearly attained by allowing the mixture to cool to 50° C., adding an equal amount of calcium hypochlorite, and ¾ part of acetone, distilling with steam, and adding three times, at intervals, ½ part acetone. If for 1 mol. of acetone 6 mols. of calcium hypochlorite and 6 mols. of potassium bromide are taken, carbon tetrabromide is obtained in amount equal to 40–45 per cent. of the theoretical.—Chem. Centr., 1894, 671.

Estimation of Carbohydrates.—E. Schulze points out that if carbohydrates, on boiling with dilute sulphuric acid, yield other products besides dextrose, the action of the acid should not be unduly prolonged. If a mixture of carbohydrates be inverted, it is almost impossible to get a good result, as some of them may already have become largely decomposed before the inversion of the others is anything like complete.—Chem. Zeit., 1894, 527.

Natural Oxycelluloses.—G. de Chalmot has made experiments similar to those of Cross, Bevan, and Beadle. The substances in plants which, on simple hydrolysis, yield furfuraldehyde, he considers to be pentosans. He has shown with regard to these that (1) both the absolute and relative quantity increase when maize or peas germinate in the dark; (2) the quantity in the seed is partly transferred to the young plant; (3) in the germination of the seeds of Tropæolum majus the absolute amount de-

creases; (4) the percentage amount increases in various organs of living plants; (5) the percentage amount shows no regular decrease or increase after the lignification is complete; (6) in the case of 30 different trees, the presence of these substances is not essential to lignification.—Ber. d. Chem. Ges., 1894, 1489.

Chemistry of Cellulose.—Cross, Bevan and Beadle propose to classify the celluloses under three headings, according to the percentage of contained carbon, the furfural yield, and their reactions.

	Percentage of carbon.	Furfural yield.	Reactions.
Cotton group.....	44 per cent.	2 per cent.	nil.
Jute group.....	43 per cent.	4.6 per cent.	Acts as though the (CO) group were present.
Cereals.....	42 per cent. or less.	12.14 per cent.	Reacts with aniline, etc., as if containing a free CO group.

The cereal celluloses are probably not true pentosans, but probably complex hexoses. By germination of certain seeds in nitric acid of different strengths it was found that the furfural yield increased according as the strength of the acid increased in which germination occurred. By taking cereals grown as starvation or full crop, and analysing them, the furfural yield in each case was found to be the same.—Pharm. Jour. Trans., 1895, 762.

New Reactions of Chloral Hydrate.—A. Jaworowski (Pharm. Ztsch. f. Russl., 1894, 373) publishes the following new reactions for Chloral Hydrate: (1) If 12 Cgms. of resorcin are dissolved in a dilute aqueous solution of chloral hydrate and the liquid is superstratified with a pipette over dilute sulphuric acid, a few colored rings appear, amongst which a brown one is distinctly visible. On shaking, the mixture turns brown; it is clear at first, but becomes turbid on cooling. On superstratifying with concentrated ammonia, the uppermost alkaline stratum turns yellowish-red. (2) Nessler's reagent produces, in an aqueous solution of chloral hydrate, a brick-red sediment, which gradually becomes brighter and finally assumes a dirty yellowish-green color. (3) If 30 Cgms. of potassium sulphocyanate are dissolved in 2 Cc. of chloral-hydrate solution (the latter to correspond to 3–6 Cgms. of chloral hydrate), and the solution is heated to ebullition and then mixed with 3–5 drops of normal potassa solution, it assumes a light-brown color, deposits a dark-brown precipitate, and is gradually more or less decolorized. On the addition of ammonia, the solution turns light-brown, but does not become turbid. (4) If 2–3 Cgms. of sodium thiosulphate are dissolved in 2 Cc. of chloral hydrate solution (as above), and this fluid is heated, the latter will assume a brick-red color and become turbid; and on adding a few drops of normal KHO, the solution turns a clear brownish-red. (5) If 6–12 Cgms. of phloro

glucin are dissolved in 3–4 Cc. of hot distilled water, and if the solution is mixed with 9–12 Cgms. of chloral hydrate, heated to ebullition and at once mixed with 16 drops of normal KHO solution, it turns a deep brownish-red. If the cooled liquid is acidulated with hydrochloric acid and shaken with amylic alcohol, the latter turns a brown-red or deep-brown. Chloroform yields under the same circumstances (phloroglucin being dissolved in hot 90 per cent. alcohol) a dirty-brown color in 2–4 hours.

The Behavior of Chloral Toward Alcohol and Water.—Ed. Schär has observed that when an alcoholic solution of chloral alcoholate is poured into water oily drops immediately separate out which are for a certain length of time insoluble in water but which after stirring for a long time will dissolve, or if allowed to stand they will form an oily layer on the bottom, which after a time without undergoing any apparent change, will become as soluble in water as ordinary fused chloral hydrate. This action he explains by the theory that the alcoholate is insoluble in water, but that on standing for some time in contact with water it gives up its molecule of alcohol in exchange for a molecule of water, and then shows the normal solubility of chloral hydrate.—Jour. Pharm. Elss. Loth., 1894, No. 8; Pharm. Centralh., 1894, 548.

Decomposition of Alcohol—Reduced Chloroform.—D. Brown and D. Rainy Brown claim that Schacht (Ber. d. Pharm. Ges., Oct., 1894,) has not proved that ethyl chloride and chloroformic ether are produced in decomposing alcohol-reduced chloroform, nor that they give reactions similar to those of alcohol. On the other hand, they think that they have proved that at the time decomposition is first recognized by zinc iodide and starch, chlorine has not been produced in sufficient quantity to combine with all the added alcohol, and that they have shown that in quantities greater than it is possible for them to exist in decomposing ordinary chloroform, neither chloroformic ether, ethyl chloride, nor carbonic ether give reactions which could be mistaken for those of alcohol.—Pharm. Jour. Trans., 1895, 836.

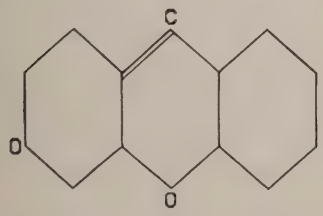
Methyl Acetate is a solvent of remarkable powers and in many cases can be used as a substitute for ether. Squibb is experimenting to manufacture this product in large quantities from wood spirit and at a proportionally small cost.—Ephemeris, 1625.

Purification of Official Ether.—Adrian (in Monit scientif., 1894, 835; Chem. Zeit. (Rep.), 1894, 286) determines oil of wine by shaking the ether with water, when if oil of wine is present a cloudy solution results. Sulphuric acid is determined by addition of a saturated solution of alkali carbonate forming an insoluble sulphate and the ether is redistilled therefrom. In this same manner acetic acid is determined and removed. Alcohol may be determined by the addition of a crystal of fuchsin, when

if alcohol is present it will be colored. The alcohol is removed by forming iodoform with KOH + I. Aldehyde is detected in ether by neutralizing the ether with alkali carbonate and passing dry ammonia gas through the ether, when if aldehyde is present there separate crystals of aldehyde-ammonia ; these may be removed by filtration ; the excess of ammonia in the ether is neutralized by H_2SO_4 and then distilled over Na_2CO_3. Pure ether should have a specific gravity of 0.720 at 15° C. and B. P. 34.5° C.

A Simple Method for Purifying Ethylic Ether.—M. Ekenberg (Chem. Ztg., 1894, 1240) states that an ether sufficiently pure for most analytical purposes, may easily be obtained from ordinary ether containing water, alcohol and oxidation products, by mixing it with 5–10 volume per cent. of liquid paraffin, and then distilling at 40–50° C. Liquid paraffin, the melting-point of which lies above 300° C. remains behind in the retort with the impurities ; only pure ether will pass over. If the ether contains a considerable portion of water, this will form a separate layer under the paraffin. By heating the latter to 120° C., the impurities will escape completely so that it may again be used. This method, it is stated, entirely frees the ether from acids, malodorous substances as superoxides. Unless a very impure product be in question, careful distillation will thus produce an ether containing only minimal traces of water and of alcohol. This method may likewise be advantageously employed, it is claimed, for petroleum-ether and light benzins, aldehydes, chloroform, etc., with the view of freeing them from components and impurities of higher boiling points.

Fluoresceïn Coloring Matter.—R. Möhlan and P. Koch apply the name of fluorone to substances containing the group I., and of fluorime to the corresponding imides, II., the name of the acid or aldehyde from which central C R group in each compound is supposed to be derived being prefixed.



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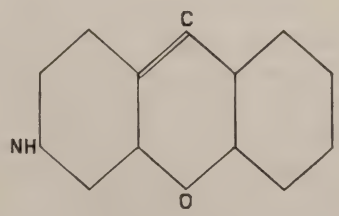

II.

—Ber. d. Chem. Ges., 1894, 2887.

Decomposition Products of Glucose.—Allein and F. Gaud.—In the estimation of glucose by Fehling's solution, it is known that a part of the glucose present escapes estimation. Gaud finds that this loss may be expressed by the formula $y = -0.00004801\,x + 0.02876359\,x^2$, where x =

the true titre of the sugar solution and y = the error. With a view to discover the source of this error, the authors have investigated the liquors resulting from a large number of estimations. Besides tartronic acid (which they consider as the main product of the action), the authors obtain lactic, dihydroxyhenyl-propionic, melassic, and glucic acids and catechol. They, therefore, believe that the error of the Fehling reaction is due to the decomposing action of the alkali on a part of the glucose before the latter has been able to exert its reducing action on the copper solution. They propose substituting an ammoniacal solution of copper sulphate for the Fehling solution.—Jour. Pharm. Chim., 1894, 300.

Preparation of Guaiacol from Veratrol.—The preparation of guaiacol from veratrol is easily accomplished by treating the latter with alkalies with the use of a sufficient quantity of a dilutent, as water or alcohol, to retard the reaction and to prevent it from proceeding still further, which would result in the production of pyro-catechin. The guaiacol is obtained from the mass formed by this reaction by distillation with steam. The yield is almost that theoretically required. The process has been patented by Merck.—Pharm. Zeit.; Amer. Drug. and Pharm. Rec., 1895, 206.

Dangers of Glycerin.—That this substance, usually regarded as so harmless, may be dangerous, and even deadly, was recently demonstrated in the clientele of Schellenberg. Eight patients, of thirty to whom he had given injections of iodoformed glycerin, were taken ill, and all suffered more or less severely (one only dying), the trouble being traced to the glycerin. From the brief account of the matter given in Les Nouveaux Remedies, we can not learn what the poisonous ingredient was; but the fact should serve as a warning to use none but chemically pure glycerin in medication. —Nat. Drug,, 1895, 111.

Test for Glycerin.—Wellmans gives the following useful tests: 1. Glycerin when mixed with an equal volume of fuchsin in sulphuric acid, should not become either immediately or upon shaking, of a deep-red color, and should not upon standing unexposed to the air, become more than a light rose color. 2. 20 Cc. of glycerin, when mixed with 2 Cc. H_2O_2 should not either upon shaking in the cold or upon warming upon a water-bath to 100° C., give an odor of butyric acid, and should not upon further heating give a deep-yellow or brownish color.—Pharm. Zeit., 1894, 776; Pharm. Rund., 1895, 17.

Inverting Effects of Glycerin.—Ed. Donath emphasizes the fact that hitherto we possess no satisfactory theory of the hydrolytic scissions of the different organic substances. He has therefore studied the inversion of certain sugars of glycerin. Anhydrous glycerin, or such as contains but little water, has a relatively feeble inverting action, whilst it increases on dilulution with 10 per cent., and still more with 20 per cent. of water.—Jour. f. prakt. Chem., 1894, part 12.

Incompatibles of Glycerin.—F. W. Haussmann (Amer. Jour. Pharm., 1895, 85) calls attention to certain incompatibilities of glycerin. The fact that glycerin, when added to aqueous solutions of borax, decomposes the latter with formation of free boric acid, is well known. The frequently asked query: What is the cause of the effervescence in preparing Dobell's solution? finds its explanation in this manner, also the pharmacopoeial identity test for glycerin. A mixture consisting of aqueous tincture of rhubarb and glycerin was found to explode when dispensed in a well-filled bottle. When this mixture was prepared in an open vessel, distinct effervescence could be observed on standing. Tinctura rhei aquosa, a preparation frequently prescribed by German practitioners, contains, besides the active vegetable ingredient, borax and potassium carbonate. The glycerin decomposes the sodium borate, with liberation of free boric acid, and the latter is again neutralized by the potassium carbonate present, with evolution of carbon dioxide. The expansion of this gas renders the bottle holding this mixture liable to fracture. The author gives the following further instances of like incompatibility: The pharmacopoeial bay rum formula is not satisfactory to many pharmacists, on account of the almost colorless appearance of the product. In their efforts to cater to the popular taste, they prefer to have the preparation of a bright-yellow or even yellowish-brown color. To effect this, some follow the practice of macerating bay leaves or turmeric, or both, in the solution of oils, while others add solution of potassa to the oils of bay and allspice before dissolving them in alcohol. Some also dissolve a certain amount of borax in the water before it is added to the alcoholic oil solution. Still others use the potash solution and make the borax addition besides. When the last method is employed, the bay rum will possess a handsome yellow color. But if the preparation, thus prepared, is mixed with glycerin, the effect repeatedly mentioned takes place, namely, the borax is decomposed and the acid liberated. This effect may readily be observed after the glycerin addition. The mixture will decolorize, the yellow color almost entirely disappears, and the previously alkaline bay rum will turn distinctly acid to test paper. Other illustrations may be mentioned where chemical incompatibility may arise between borax and glycerin, but a little reflection will readily indicate the liability of its occurrence. In the preparation of toilet washes, in which it is desired to keep the borax unchanged, this fact must be considered with care. * * * Astringent fluid extracts, such as those of sumach berries, rose, etc., as a rule contain glycerin, and it is well known that these preparations enter frequently into mouth-washes containing borax.

Iron in Commercial Glycerin.—The practice of keeping glycerin in tinned iron cans, often for a prolonged time, will have the effect of contaminating the same with traces of the metal. As special inducements are usually offered by the wholesale dealers to buy this liquid in lots of fifty pounds, cans of this capacity are generally found in retail pharmacies, and

often form the only stock-container, entailing the above-mentioned contamination. In many operations, both in the laboratory and on the prescription counter, the delicate iron reactions produced with certain compounds are productive of color changes, which are at times difficult of explanation. These may be produced by impure articles, in this instance the iron-contaminated glycerin. In a number of instances where glycerin was kept in the containers mentioned, such reactions were produced and found at times to be the source of considerable trouble.—Ibid.

Stability of Hydroxylamine.—L. de Bruyn (Ber. d. Chem. Ges., 1894, 967) reports that he has ascertained that free hydroxylamine is rather stable at temperatures below 15° C., while, from 20 to 30° C. its stability progressively decreases. Both in its solid and melted state, slow decomposition takes place with the development of vesicles (nitrogen and nitrogen monoxide). This decomposition may be regarded as a self-oxidation and reduction. While one portion gives off oxygen, with the formation of ammonia, another suffers oxidation into hyponitrous and nitrous acids, which undergo further change with the hydroxylamine and ammonia. Decomposition is not even prevented by keeping the substances in the dark.—Chem. News, 1894, 111.

Synthesis of Indigo Blue.—C. Engler and A. Emmerling, twenty-five years ago, synthethized indigo by heating syrupy nitracetophenone with a mixture of zinc dust and soda-lime. Wichelhaus' failure to obtain indigo in this manner was probably due to the presence of metanitracetophenone in considerable quantity in the nitro product, to the temperature being too high, or to the use of unsuitable zinc dust. The following method of obtaining indigo is trustworthy, and may be employed as a lecture experiment. Zinc dust (24 Gms.), soda-lime (4 Gms.), and recently ignited marble (2 Gms.) are intimately mixed, orthonitracetophenone (1 Gm.) dissolved in chloroform (10 vols.) is added, and, after thorough stirring, the mixture is exposed to the air for 1–2 days; portions of 1 Gm. are heated in a test-tube blown to a bulb, and placed horizontally over the blow-pipe for seven seconds, or somewhat longer over a burner. The reaction is facilitated by filling the tube with hydrogen and passing the evolved gases through water; the result is even better if, to the orthonitracetophenone, an equal amount of acetophenone is added, and the mixture treated with zinc dust, etc. as above.—Ber. d. Chem. Ges., 1895, 309.

Indigo.—C. J. van Lookeren and P. J. van der Veen have prepared indican from the leaves of plants belonging to the species indigofera, and and their results are identical with those obtained by Schunck in his experiments with *Isatis tinctoria*. The sugar which the authors obtained as a syrup of hydrolyzing their indican, was dextro-rotatory, reduced Fehling's solution, gave a brown coloration with alkalies, and was probably identical with ordinary glucose. The so-called indigo-gluten is probably a mixture

of nitrogenous decomposition products of indican, with a certain amount of the enzyme, rendered inactive, which determines the hydrolysis of indican. Schunck's oxindicanin gives a red precipitate when warmed with Millon's reagent. Experiments are next described which point to the existence of an enzyme as the hydrolyst of indican thus the hydrolysis of indican proceeds under conditions which exclude the presence of microorganisms. The quality of the indigo-blue is affected by continuing the lixiviation process too long, which is done in practice, and the cause of this may be the action of bacteria. If the so-called fermentation is protracted, the indigo-blue contains a larger proportion of calcium salts and more indigo gluten. According to the authors, the usual practice is to employ water at a temperature of 27.5° for the fermentation; better results are obtained by digesting with water at an initial temperature of 55°, the fermentation being continued for about 7 hours at a temperature of about 28° C. The authors find that in the manufacture of indigo-blue, equivalent quantities of lime, potash, or soda, may be used instead of ammonia. —Landw. Versuchs-stat., 1894, 401; Jour. Chem. Soc., 1895, 96.

Adulterated Iodoform.—A commercial sample of iodoform was found to contain 13 per cent. of water, without its general appearance or physical characters being in any way impaired. A good sample should not lose more than 1 per cent. of its weight in the desiccator.—Revue Médicale; Brit. and Col. Drug., 1894, 525.

Linalol and Licareol—P. Barbier.—Referring to Bouchardat's paper, the author claims priority of discovery of the tendency of acetic anhydride to cause the conversion of alcohols of this class into isomerides. He also denies the identity of linalol and licareol.—Bull. Soc. Chim., 1894, 261.

Maltol.—J. Brand has observed that "caramel," the aqueous coloring extract obtained from malt, frequently gives a reaction with perchloride of iron similar to that given by salicylic acid. The reaction is not however due to the latter substance, but to a body of a phenolic character isolated from caramel by the author, and called by him "maltol." It is extracted by treating the caramel with ether, and subliming the residue after the evaporation of the ether. Maltol is a crystalline substance, melting at 159° C., soluble in water, chloroform and ether, of the formula $C_6H_6O_3$, and presenting all the characters of a phenol. It is liable to be mistaken for salicylic acid in the analysis of beers, etc., but may be distinguished by not giving a coloration with Millon's reagent, while salicylic acid gives an intense red color.—Ber. d. Chem. Gess., xxvii., 806.

Preparation of Hydrazine.—The preparation of this interesting body, discovered by Curtius in 1889, has been both indirect and difficult. The methods have generally depended on reduction, or reduction and hydrolysis of complex diazo-, nitrosamin-, or nitrosamin-derivatives of the aliphatic series, such as amido-guanidin ($NH_2C(NH)_2NH_2$), or diazo-acetic ester

($CH.N_2.COOEt$). Duden has now been able to prepare this compound from an inorganic salt by reduction. For this purpose he uses the salt obtained by the action of sulphurous acid on potassium nitrite—a compound of potassium sulphite with nitric oxide, $K_2SO_3.N_2O_2$, and by reducing this in alkaline solution at a low temperature with sodium amalgam he obtains hydrazine and potassium sulphate. The first stage consists probably in the reduction to a salt of hydrazine, which is then hydrolized by alkali, according to the following equations:

$$\text{I.}\quad \begin{matrix}KSO_3\\KO\end{matrix}\!>N.NO + 3H_2 = \begin{matrix}KSO_3\\H\end{matrix}\!>N.NH_2 + H_2O + KOH.$$

$$\text{II.}\quad \begin{matrix}KSO_3\\H\end{matrix}\!>N.NH_2 + KOH = HN_2.NH_2 + K_2SO_4.$$

The hydrazine was identified by the formation of the sulphate and the compound formed with benzaldehyde-benzal-azin.—Ber. d. Chem. Ges., xxvii., 3498.

Phenylhydrazine.—Berthelot. — Phenylhydrazine when exposed to air quickly becomes yellow; the change is never distinct if it is previously dissolved in water or dilute acids, brown insoluble matter separating from the solution. This change is due to oxidation, and is most marked when the solution of phenylhydrazine hydrochloride is mixed with sodium acetate; oxygen is absorbed and an equal amount of nitrogen is liberated, this ratio being maintained at every stage of action, which is complete in 12 hours at 100°. Oily uncrystallizable diphenylhydrazine separates from the liquid. Pure anhydrous phenylhydrazine when heated at 100° with oxygen in closed vessels absorbs 1.1 to 1.25 atoms of oxygen, and 1.6–1.7 atoms of nitrogen is liberated. The products are resinous, uncrystallizable, and insoluble in water. Pure liquid-phenylhydrazine absorbs moisture from the air, and after a few days crystallizes if the surrounding temperature is below 22°. The hydrate can also be obtained by mixing the compound with rather less than half its volume of water, and allowing the mixture to evaporate spontaneously; beautiful colorless crystals separate, which soon become yellow, and eventually orange, in consequence of slow oxidation. The most rapid method of preparing the hydrate is to mix 10 Cc. of phenylhydrazine with 0.9 Cc. of water. It has the composition $2C_6H_8N_2 + H_2O$, and melts at 24.1°, whilst anhydrous phenylhydrazine melts at 17.5°, and not at 23° as is commonly stated.—Compt. rend., 1894, 5.

Phenol and Aluminum.—M. Ballard has found, as the result of experiments, that crystallized phenol and its alcoholic solution have no sensible action upon aluminum at temperatures about 60° to 70° C. He suggests, therefore, that aluminum receptacles made without seams might prove more serviceable than glass bottles for conveying the phenol, particularly in time of war.—Jour. Pharm. Chim., 1894, 309.

Carbolic Acid.—G. Coull (Brit. and Col. Drug., 1894, 618) suggests that the melting point be not lower than 102° F. (38.8° C.), and that the boiling point be not higher than 359.6° F. (182° C.), the bulb of the thermometer being immersed in the acid. These two constants are not more exacting than necessary, as it has been demonstrated that carbolic acid can be easily obtained having these characters.

Concentrated Solution of Phenol.—It is well known that glycerin increases the solubility of phenol in water, but the strong solution is very caustic. Sulphoricinate of sodium is claimed to be of great value in aiding the solubility of this body, since it will maintain 40 per cent. of phenol in solution without destroying its antiseptic power, and yet without causticity. As its name implies, it is a product of castor oil.—Journal de Pharmacie d'Anvers; Brit. and Col. Drug., 1895.

Pine Tar and Creosote.—A. Renard finds that 66 per cent. of the product of pine tar, distilling between 200° and 220°, correspond as to boiling point with ordinary creosote. The portion distilling between 200° and 210° consists of monophenols, 40 per cent.; guaiacol, 20.3 per cent.; cresol and its homologues, 37.5 per cent.; whilst the loss is 2.2 per cent. The fraction passing over between 210° and 220° does not contain guaiacol. Generally, the composition of pine creosote may be regarded, with reference to its guaiacol strength as intermediate between that of the creosotes of beech and oak.—Compt. rend., cxix., 1276.

Wood Creosote.—Behal and Choay find that beechwood creosote is richer in guaiacol and has a greater density than that from the wood of the oak. It contains less monovalent phenols and is less caustic. Creosote is generally regarded as consisting of 60 to 90 per cent. of guaiacol, together with creosol, and a small proportion of monovalent phenols. The composition of beech wood creosote, passing over at 200° to 210° C. is given as follows: Monovalent phenols, 39 per cent.; guaiacol, 26.48; creosol and its homologues, 32.14; loss, 2.38. Oak wood creosote, under similar conditions, yielded: monovalent phenols, 55 per cent.; guaiacol, 14; creosol and its homologues, 31.—Compt. rend., cxix., 166.

Halogen Alkyl Derivatives of Isoquinoline.—A. Claus.—Attention has already been called to the existence in the cinchona alkaloid of a nitrogen atom whose function is similar to that of the nitrogen atom in isoquinoline. The alkylene bases must be regarded as having their alkylene groups centrally disposed within the nitrogen ring. It is shown that the similar derivatives of the cinchona alkaloids probably have an analogous structure, for the decomposition of isoquinoline and of those alkaloids when heated with an alkylic iodide and potassium hydroxide, is of the same deep-seated character, and is attended by the formation of similar products.—Jour. f. prakt. Chem., 1894, 295.

Constitution of the Rosanilines.—A. Rosenstiehl.—A claim to priority as against Stock.—Bull. Soc. Chem., 1894, 212.

Determination of Starch.—P. L. Hibbard (Jour. Amer. Chem. Soc., 1895, 64) recommends the following method of starch determination as being shorter and easier of execution than that in vogue, whilst being quite accurate. The substance to be examined is finely pulverized, and a quantity of it containing at least 0.5 Gm. of starch, is placed in a flask with about 50 Cc. of water and 1 or 2 Cc. of aqueous malt extract, prepared by covering powdered dry malt with water containing 15 to 20 per cent. of alcohol and filtering off the infusion after a few hours. The mixture is at once heated to boiling, with frequent shaking to prevent the formation of clots of starch. After boiling for a minute, cool to 50—60° C., and add 2 or 3 Cc. malt extract, then heat slowly for 10—15 minutes till boiling; partially cool, and test with iodine solution. If there is any blue coloration, the treatment with malt extract must be repeated; but if all the starch is changed, cool the mixture, make up to a definite volume, and filter through linen or muslin. An aliquot part of the filtrate, containing 0.2 Gm. to 0.3 Gm. of starch, is placed in a 100 Cc. flask with 50 Cc. of 30 per cent. hydrochloric acid and enough water to make 60 Cc. Boil moderately for thirty minutes on a sand-bath. Complete conversion will now have taken place, and on cooling the solution and nearly neutralizing with sodium hydroxide, the dextrose is determined by Fehling's solution.

Determination of Starch.—W. E. Stone shows that pentosan behaves toward the ordinary reagents as starch does, and that the most hopeful way of avoiding this difficulty is by use of diastase or malt infusion.—Chem. News, 1894, 309; Jour. Amer. Chem. Soc., 1894, No. 1.

Estimation of Starch by Alcoholic Fermentation—A Munsche.—The sample is treated with an aqueous infusion of malt, which, at a temperature of 61–65° C., will in about half an hour completely dissolve the starch. After cooling some mineral phosphatic yeast food is added, also some nitrogenous food in the shape of asparagine. After adding a weighed quantity of yeast, the liquid is put into an ordinary fermentation flask and fermented for 72 hours. Both carbonic anhydride and alcohol are estimated, but an allowance is made for the amount of these substances yielded by the malt extract itself. 51.29 parts of carbonic anhydride or 53-43 parts of alcohol correspond with 100 parts of starch.—Chem. Centr., 1894, 220.

Blue Iodide of Starch.—With a view of determining between the views of Mylius and Stocks, C. F. Roberts has experimented on this subject. When blue iodide of starch is precipitated, well washed with dilute sulphuric acid, and then iodic acid added, the solid dissolves to a colorless liquid, although the presence of free iodine therein can be proved by shaking with chloroform. A single drop of a weak solution of silver nitrate is enough to destroy the deep blue color of a test tube full of liquid. Both these experiments point to the discharge of color being due to the removal of hydriodic acid rather than of iodine. The authoress has been unable

to obtain an aqueous solution of iodine perfectly free from hydriodic acid. If, however, a chloroform solution of iodine is well washed with water to free it from hydriodic acid, and then immediately shaken with pure water and starch emulsion, no coloration is produced. The addition of a little hydrochloric acid, or of potassium iodide, or heating the liquid, or exposing it to sunlight (the latter two operations, of course, causing the formation of traces of hydriodic acid) at once causes the blue coloration to appear. Then iodine chloride is added to starch-blue, the blue color is discharged, but iodine at the same time set free. The reaction is probably $HI + ICl = HCl + I_2$, the hydriodic acid being taken from the starch-blue. The fact that considerable quantities of iodic acid must be added to liquids containing starch-blue before the color is discharged is probably due to the fact that, as shown by Landolt and others, the reaction between hydriodic and iodic acids in dilute solution is very slow, and that in an aqueous solution of iodine in the light, traces of hydriodic acid are being constantly formed. Her experiments lead the authoress to support Mylius' formula, $(C_6H_{10}O_5I)_nHI$, for starch-blue.—Amer. Jour. Sci., 1894, 422.

Combination of Iodine with Starch.—E. G. Rouvier.—When an aqueous solution of starch is mixed with iodine in excess but in quantity insufficient to form the compound $(C_6H_{10}O_5)_{16}I_5$, the quantity of iodine absorbed increases with the quantity added. The proportion of iodine that enters into combination for a given quantity of iodine added decreases, however, as the percentage of iodine in the product increases. When this percentage is between 13 and 17.5 the quantity of iodine taken up is practically equal to the cube root of the quantity of iodine added. Below 13 per cent. the quantity of iodine taken up increases more rapidly, but, on the other hand, above 17.5 per cent. it increases much more slowly. Rice starch behaves in exactly the same way as wheat starch, but potato starch seems to combine with a smaller proportion of iodine even in presence of a large excess of the latter.—Compt. rend., 1894, 743.

The Action of Diastase on Starch.—A. R. Ling and J. L. Baker have examined the hydrolytic products of starch when acted on by diastase. The diastase was obtained from different sources and prepared by different methods. The authors confirmed the previous results recorded by Brown and Morris, since they obtained maltodextrin, the physical constants of which were determined and found to agree with those given by Brown and Morris. "Isomaltose," another product of the hydrolysis of starch, was also isolated, and the osazone on examination possessed the same melting point as that recorded by Lintner. The isomaltose was purified by crystallization and precipitation from methylic alcohol solution by absolute alcohol. The isomaltose thus obtained agreed in these respects with that obtained by Lintner, but on treatment with sodium acetate and acetic oxide a mixture was obtained from which octacetyl-maltose was

separated and identified. The isomaltosazone was also proved to be a mixture, since maltosazone was separated and identified. Further experiments on the action of diastase and determination of its reducing power showed that isomaltose is not a homogeneous substance, but a mixture of maltose with probably two other substances. One of these was separated, and from examination of the osazone is probably a new sugar—$C_{18}H_{32}O_{16}$—for which the name amylotryose is proposed. The other substance present in isomaltose appeared to be a dextrin which, however, was not identified. H. Brown stated that experiments in progress in his laboratory confirmed the conclusion recorded above as to the non-homogenity of isomaltose so far as that it was not a pure substance nor an isomer of maltose. Kipping suggested that a better name for the new sugar would be triamylhexose.—Amer. Drug. and Pharm. Rec., 1895, 206.

Iodide of Starch Reaction.—C. Meinske.—An aqueous solution of iodine may be added to a solution of starch until the liquid is decidedly yellowish without developing any blue color. The smallest amount of potassium iodide, however, is sufficient to give the reaction. This seems at first a confirmation of Mylius's statement, that iodide of starch contains potassium or hydrogen iodide as an essential constituent: but the author's investigation proves that the presence of a soluble iodide is not at all necessary for obtaining the blue compound. The author has tabulated the result of a large nnmber of experiments, showing that the compound is also formed, more or less completely, in the presence of other salts, such as potassium, sodium, ammonium, calcium and barium chloride; potassium, sodium, ammonium and magnesium sulphate; potassium alum; potassium and sodium biborate.—Chem. Zeit., 1894, 157.

Starch as a Mountant.—J. H. Baldock points out that the starch must be brought into a state of disintegration, not solution, the usual plan being to make it into a cream with cold water, and then, while constantly stirring, pour on boiling water until thickening takes place. More complete disintegration is obtained, however, by subsequently boiling for a few minutes, whilst a clearer jelly is obtained and better keeping properties are secured. The paste should not be too thick, and if not made fresh at the time of using, should be boiled well, and have a little boric or salicylic acid or oil of cloves added as a preservative. Alum is objectionable in starch paste for photographic purposes. H. D. Gower prepared a paste that kept well by adding an ounce of starch to half a pint of water, nnd heating, with constant stirring, until thickening occurred. Heat for a few minutes longer, remove from the source of heat, add half an ounce of glycerin, and, when nearly cold, half an ounce of methylated spirit. A few drops of oil of cloves or other essential oil may be added if desired, but this is not necessary.—Photography, 1895, 210; Pharm. Jour. Trans., 1895, 1092.

Wheat and Rye Starch.—E. Guenez points out that these starches

possess very similar characters, and it is difficult at times to say decidedly that a given sample consists of one rather than the other. To distinguish the two kinds he recommends that a little of the material be mounted in water for examination with the microscope. The wheat starch will then be seen to contain comparatively few split grains, which possess an isolated fracture situated near the edge or proceeding from the centre to the circumference. In the case of rye starch the split grains are more numerous and possess a star-shaped fracture with three or four branches, apparently originating in the centre of the grain and rarely reaching the grain. Some grains may also be found which have only a linear crack, but this will be larger in the centre of the grain than towards the edges, just the reverse of what occurs in wheat.—Bull. de Pharm. de Bordeaux, xxxiv., 289.

Decomposition Products of Saccharose.—E. O. v. Lippmann.—A disused conduit, formerly employed for "claircе," was taken to pieces, when the inner portions of the tubes were found to be incrusted with a thick, black, tasteless, and odorless deposit, having all the properties of the so-called humous matter. This substance had apparently been formed by gradual decomposition from the pure sugar solution remaining in the tubes at a temperature of 35–40° C. Alcohol extracted a crystalline substance from the mass, which after repeated recrystallization from that solvent, fractional precipitation with basic lead acetate, and treatment with animal charcoal, was separable into mellitic acid and pyromellitic acid.—Ber. d. Chem. Ges., 1894, 3408.

Compounds of the Sugars with Iron.—Iron Sucrate, containing 48.5 per cent. of iron, is obtained as a crystalline reddish-brown powder by pouring a solution of cane sugar and ferric chloride into a slight excess of aqueous sodium hydroxide; it dissolves to the extent of about 95 per cent. in cane-sugar solution, leaving a residue of ferric hydroxide. Iron maltosate was prepared in the same way. It is a brown, amorphous substance, and it is not mixed with free ferric hydroxide, for it dissolves entirely in maltose solution. It contains about 32 per cent. of iron, corresponding with the formula $2Fe_2O_3.C_{12}H_{22}O_{11} + 2\ H_2O$.—F. Evers, in Ber. d. Chem. Ges., 1894, 474.

Syntheses in the Sugar Group—E. Fischer.—This paper is a compilation of the work accomplished by the author and his collaborators, together with the more important researches of other chemists in the same domain, since the year 1891. It thus forms a continuation of the paper on the same theme which the author delivered as a lecture before the German Chemical Society. The first section deals with experimental methods, and in the next section the present aspect of the sugar group is discussed, the known aldoses and ketoses being tabulated together with the mono- and the di-basic acids and polyhydric alcohols derived from them. The author then deals with the stereochemistry of the sugar group, and from this leads

up to the configuration of the sugars and allied compounds. He then describes a nomenclature which expresses the configuration of these compounds in a more concise manner; thus glucose is denoted "hexose + − + +," or "hexapentolal + − − + +." These formulas do not however represent, as did those of van't Hoff, the influence of a single asymmetrical carbon atom on the optical properties of the molecule, but only the position of one substituent to the right or left side of the configuration formulas. The last two sections are under the following headings: "Influence of Configuration on Chemical and Physical Properties" and "Importance of Stereochemical Results in regard to Physiology."—Ber. d. Chem. Ges., 1894, 3189.

Volumetric Sugar Estimation.—Samelson.—The gravimetric estimation of sugar by means of Fehling's solution has lately been again recommended instead of the volumetric process, on account of its supposed greater accuracy. The author thinks, however, that the volumetric process may be advantageously employed instead, if only the precaution be taken to ascertain the real titre of the alkaline copper solution, and not to blindly trust to its supposed strength.—Zeit. f. angw. Chem., 1894, 267.

Estimation of Crystallizable Sugar in Raw Sugars.—M. Karcz.—30 or 50 Gm. of the sample is mixed in a dish with an equal weight of absolute glycerol, and placed for some time in a desiccator. The glycerol soon dissolves the adhering syrup, but leaves the crystals intact. After pouring the glycerol into a glass funnel filled with cotton wool, and provided with a cover containing a calcium chloride tube, an aliquot part of the filtrate is examined in the polariscope; the polarization deducted from that of the original raw sugar gives the amount of crystallizable cane sugar in the sample.—Chem. Centr., 1894, 845.

Action of Permanganate on Sugar.—When potassium permanganate in aqueous solution is added to a similar solution of sugar, it is reduced to manganese sesquioxide, and E. Maumené finds that this compound is soluble in strong solutions of sugar (1 in 1 or 2 of water), partially soluble in weaker solutions (1 in 3), but insoluble in very dilute ones (1 in 4 or 5). By keeping solutions for some days at a temperature of 15° C., as much as 0.5 Gm. of sesquioxide has been dissolved by 15 Gm. of sugar and 30 Gm. of water. It appeared, however, to lose oxygen, and gradually became reduced to protoxide, whilst the sugar became converted into hexenic acid, $C_{12}H_{12}O_{14}$.—Compt. rend., cxx., 783.

Salts of Tetraallylammonium.—H. Orlow (Pharm. Ztschr. f. Russl., xxxiii, 769) reports on the preparation of these salts. As is known, the chief result of the action of aqueous ammonia upon allyl iodide is the production of tetraallylammonium iodide. It is advisable to allow the mixture of the liquids to stand in a covered vessel, when a crystalline precipitate of the salt mentioned will be obtained. In repeating these experi-

ments a number of times, the author found that perfect crystallization is obtained but rarely; ordinarily, after the deposit of a few needles, an oily layer of subiodide forms, which remains unchanged for weeks. But on heating on the water-bath and frequently shaking, there will be attained in a short time a perfect solution of allyl iodide in ammonia, and, after subsequent crystallization, a splendid tetraallylammonium iodide will be obtained. To prepare the other salts, the author employed a solution of lead acetate, instead of causing hydrated silver-oxide to act upon the allyl iodide, removing the lead by sulphuric acid and evaporating the solution of the sulphate of tetraallylammonium. Fine crystalline salts were obtained with the aluminum and chromium alums; they crystallized much better than the corresponding alums of tetramethylammonium. However, the tetraallylammonium alums crystallize fully as perfectly as the corresponding potassium alums, and completely separate even when present only in small quantities, and often in the shape of well-developed crystals.

APPLIED CHEMISTRY.

Micro-chemistry of Albuminoids.—De Wevre concludes an exhaustive communication on the methods employed in micro-chemical researches on the albuminoids, by stating that these compounds cannot be localized by any single reagent, a combination being required always. He recommends that sections should be boiled first in water, and then in absolute alcohol, before adding reagents. The best of these for the purpose, arranged in the order of their sensibility, are iodized potassium iodide or an aqueous solution of eosine; Millon's reagent; picric, xanthoproteic, or phosphomolybdic acid and Guezda's reaction; Piotrowski's biruet reaction; Reichel and Mikosch's reaction. If all these reagents act, after treatment of the sections with boiling water and alcohol, it is safe to conclude that proteid substances are present. In Guezda's reaction a concentrated solution of nickel sulphate saturated with ammonia turns yellow or blue with proteid matters, the blue changing to orange yellow on adding caustic potash. Reichel and Mikosch's method is to add to the substance under examination about twenty drops of an alcoholic solution of benzaldehyde, followed by an excess of sulphuric acid diluted with its own water, and containing traces of ferric sulphate. An intense blue coloration is thus imparted to albuminoids. Absolute alcohol is recommended as the best coagulating medium; and the xanthoproteic reaction is said to be very good for sieve tubes, in place of eosine. It is stated also that the albuminoid reactions of sieve tubes are not always very intense, and that a large quantity of proteid substances occurs in the growing points of roots and in the laticif-

erous tubes of various plants, notably Carica papaya.—Pharm. Jour. Trans., 1894, 71 ; from Journ. de Pharm. d'Anvers, 1, 209.

Detection of Albumin.—E. J. Evans has compared the relative merits of the various tests for the detection of albumin, and favors the molybdie tests first and then the uranium and the picric acid test.—Pharm. Jour. Trans., 1895, 913.

Resorcin as a Reagent for Albumen.—Carrez proposes to use resorcin as a reagent for albumen in the urine. To make the test he takes 1 Gm. of resorcin and dissolves it in 2 Gm. of cold water ; 2 Cc. of urine are then poured carefully on to the resorcin solution. If the urine contains albumen, a white ring is formed between the two layers of liquid ; alkaloids, urates, and urea are not precipitated by resorcin ; peptones do give a precipitate, which disappears on warming, so that the test tube should be placed in warm water for a few minutes, when the precipitate is obtained. If it disappears it is due to peptones. Carrez states that resorcin constitutes a very sensitive test and is superior to nitric acid.—Jour. Pharm. Chim., 1895, 619.

Albumone.—R. Brunner.—Chabrié prepared from human blood serum a new proteïd he called albumone. Ox blood, by similar treatment, yields the same substance. It does not, however, pre-exist in the serum, and the present research shows that it is formed during the process of heat coagulation, partly from serum-albumin, partly from serum-globulin. Inaug. Diss. Bern., 1894 ; Jour. Chem. Soc., 1894, 480.

Estimation of Albumin.—A. Clarency proceeds as follows: 20 Cc. of the urine is filtered, and, if not yet perfectly clear, 0.5 Cc. of $\frac{N}{10}$ silver nitrate is added and the liquid refiltered ; 12 Cc. of the clear urine is then introduced into a graduated tube, 8 Cc. of a 12.5 per cent. solution of trichloracetic acid added, the whole shaken five or six times, allowed to remain three minutes, and again similarly shaken. The liquid is then introduced into the Aglot apparatus and examined with the opal glass as usual. The thickness E in Mm. of liquid necessary to extinguish the light, multiplied by the quantity Z of albumin in Gm. per litre, is a constant C, which is, under the above conditions, 8.2. Therefore $Z = 8.2/E$. The trichloracetic acid may be replaced by Esbach's solution, in which case the constant becomes 5.0.—Jour. Pharm. Chem. 1894, 484.

Coagulations of Albumin.—Coagulable albuminoid substances are found by Ramsden to become converted into solid masses by simple agitation, whether in acid, neutral, or alkaline solutions, and independently of the presence of oxygen, hydrogen, nitrogen, or carbon dioxide. The coagulation is not due to the generation of heat, as it takes place indifferently at all temperatures, and has even been produced in the case of solutions (ammonium albuminate and casein in lime water) which do not coagulate on boiling. In addition, the coagulum produced differs in composition

and properties from that obtained by the action of heat. Fresh serum, when alkaline, is but slightly affected by agitation, but the presence of acids or salts favors coagulation.—Arch. f. Physiol. & Jour. Pharm. Chim., 1, 325.

Ash-free Albumin.—K. Bülow.—Ash-free albumin was prepared by Harnack's method from various proteid sources; and although the original proteids differ in their properties, the ash-free product does not. It is insoluble in water, and like amido acids, it forms, with acids and bases, salts soluble in water; it appears to form, with bases, two categories of compounds. The acid solutions are very sensitive to neutral salts, a small addition producing precipitation; the alkaline solutions are indifferent to neutral salts. In this direction the sulphates of the alkali metals act most strongly, then the nitrates, then the chlorides. The specific rotary power of proteids is markedly altered by small admixtures of other substances. —Pflüger's Archiv, 1894, 207; Jour. Chem. Soc., 1895, 196.

Classification of Nuclein and Nucleo-albumin.—The following classification of nucleins and nucleo-compounds, is given by Hammarsten in the Zeitschrift für Physiologische Chemie.—*Nuclein*, to designate, after Kossel, such phosphorus-containing substances as remain in the peptic digestion of complex proteids, which further are compounds of albuminous substances with nucleic acid and yield xanthin-like bases by decomposition. *Paranuclein*, include, after Kossel, nuclein-like bodies which are formed in peptic digestion of simple albuminous substances, but which do not yield nuclein bases. Since these substances differ much among themselves, and are only similar in that they resemble nucleins in certain particulars, Hammarsten suggests that they be called *pseudo-nucleins*. *Nucleo-albumin*, to include only phosphorus-containing simple albuminous substances, as, for example, casein, which are not compound proteids, and by peptic digestion yield pseudonucleins. *Nucleo-proteids*, to include all complex proteids which by peptic digestion yield, besides simple proteids, true nucleins, and give by more profound decomposition nuclein bases. To this class belongs a compound which the author has discovered in the pancreas, and calls the pancreatic nucleo-proteid. It is made up not only of nuclein in combination with an albuminous substance, but contains some third part, perhaps animal gum, which, by heating with dilute acids, yields a reducing body. Hammarsten is unable to state the exact nature of this reducing substance, though the evidence favors the view that it belongs to the penta-glucoses. The fact that this complex proteid of the pancreas is capable of yielding a reducing body is of interest in connection with the continuation of glycosuria or diabetes in patients from whom all carbohydrates are withheld for a considerable time, and whose food is hence entirely proteid in nature; it suggests a possible explanation of the origin of sugar from proteid matter.—Amer. Drug. and Pharm. Rec. 1894, 233.

Detoction of Margarin in Butter.—Seyda and Woy criticise the three principal processes in use for the detection of margarin in butter: *Köttstorfer's Method.*—This process, which gives the saponification number of the sample, is, of course, affected by the natural variation in the composition of butter-fat, but it is almost free from analytical errors, and therefore, the best process as yet known. *Reichert-Meissl Method* is based on the estimation of the volatile fatty acids. This process is liable to several analytical errors, the chief objection being that the whole of the volatile fatty acids is not collected, and it is only by exercising the greatest precautions that something like concordant results can be obtained. *Hehner's Method.*—This process is based on the estimation of the insoluble fatty acids, and in the author's opinion is the most complicated and trustworthy of the three, and quite unsuited for commercial laboratories. Although the excess of mineral acid is comparatively soon washed out, the soluble fatty acids are only removed with great trouble, often necessitating a washing with 2–3 litres of boiling water. There is also great danger of serious loss by the insoluble fatty acids passing through the filter.—Chem. Zeit., 1894, 906.

Modification of the Reichert-Meissl Butter Process.—C. Bünte criticises the sulphuric acid process lately proposed by Kreiss and modified by others, and has finally adopted the following plan: 5 Gm. of butter-fat is introduced into an Erlenmeyer liter flask, and heated for a time in a drying oven at 100°; 10 Cc. of sulphuric acid (sp. gr. 1.8355) is added, and the mixture well agitated until all the fat has dissolved. The flask is now put into water at 30–32° C. for 10 minutes; 150 Cc. of water is added, and then strong solution of potassium permanganate until the liquid acquires a transitory pink color. The liquid is then subjected to the usual distillation and titration.—Chem. Zeit., 1894, 204.

Periodic Estimation of Volatile Fatty Acids in the Butter Produced during a Year.—L. Cantoni and L. Carcano.—With the view of ascertaining the causes of the variations in the amounts of volatile fatty acids in butter, samples of butter from three dairies were examined weekly for a year. The results, which are given in tables, do not show any great difference or regularity. This is, perhaps, due to the fact that in the Lombardy dairies coloring does not take place at definite periods, and a kind of compensation may thus take place between conditions which raise and lower respectively the amount of volatile fatty acids. A table is also given showing the results of experiments with Zeiss' butter refractometer, as well as the volatile fatty acids.—Staz. Sper. Agrar., 1894, 131; Jour. Chem. Soc., 1894, 95.

Salt-like Combinations of Casein.—Casein combines with bases to form salt-like compounds which may be neutral or acid to phenolphthalein. Physiological experiments performed on dogs and in a limited degree on

man seem to indicate that the acid compound of casein with sodium might serve as a substitute for peptone. The acid calcium casein salt, when mixed with milk-sugar and the copper salts, yields a powder which, when heated with water, produces a liquid possessing all properties of fat-free milk. The silver compound differs from other silver salts in not coagulating albumin and in not being precipitated by chlorides, alkali sulphides, etc. Its antibacterial power, however, is but little inferior to that of silver nitrate.—F. Roehmann, in West. Drug., 1895, 62.

Production of Cyanides.—H. N. Warren.—Attention is drawn to the small amounts of cyanide produced by igniting potassium nitrate with Rochelle salt or sodium acetate, or even when the nitrate is made into briquettes with wheat flour and magnesia and ignited; to the occasional inferiority of the product from thiocyanates; and to the value of the addition of lime or baryta when preparing cyanides by the incineration of nitrogenous compounds.—Chem. News, 1894, 186.

A New Explosive Mixture.—A. Angeli.—The action which occurs when a mixture of potassium nitrate, potassium carbonate and sulphur explodes is usually represented by the equation $6KNO_3 + 2K_2CO_3 + 5S = 6N + 2CO_2 + 5K_2SO_4$. On substituting potassium nitrite for the nitrate, a mixture is obtained which explodes in much the same way as the above. It is therefore probable that, during the fusion preceding the explosion, potassium nitrite is formed by the reducing action of potassium sulphide, which, in turn, owes its formation to the interaction of the potassium carbonate and sulphur. A mixture of potassium nitrate with hypophosphite detonates in a similar manner, and potassium nitrite is found in the product obtained on cautiously melting potassium nitrate and hypophosphite together; the same is true of mixtures of nitrates and thiocyanates. On heating a mixture of sodium thiocyanate with potassium nitrate, it first melts and then deflagrates slightly, whilst a mixture of the thiocyanate with potassium nitrite detonates violently.—Gazzetta, 1894, 52; Jour. Chem. Soc., 1895, 9.

Use of Selected Ferments.—Charles Fahé.—From the author's experiments it results that ferments introduced to produce fine wines cannot be sown in any must. Such ferments should be sown in a must of grapes derived from, or acclimatized for a long time in the regions whence the selected culture has been obtained.—Compt. rend., vol. cxix., No. 6.

Rennet and Similar Ferments.—R. Peters.—By means of rennet, not only is the natural or artificial solution of caseinogen precipitable, but also solutions of casein, or boiled whey proteids and various other proteids of animal and vegetable origin under certain conditions, of which the presence of calcium hydroxide is the most important. The precipitated proteid can be dissolved, and is again precipitable by the ferments. Part of the proteid, however, always remains in solution, due to splitting of the

proteid molecule, as Hammarsten showed. Ferments similar in their action are found in different parts of the vegetable kingdom.—Preisschrift, Rostock, 1894; Jour. Chem. Soc., 1895, 80.

Remarks on the Heating and Spontaneous Ignition of Hay.—M. Berthelot.—The increase of temperature which determines the spontaneous ignition of hay results from purely chemical reactions, which bear upon products modified at first by fermentations.—Bull. Soc. Chem., vols. xi–xii., No. 15.

Action of Light on Diastase.—J. R. Green states that the results of the experiments that have so far been conducted show that light, whether solar or electric, exercises a destructive effect upon diastase, which continues after the exposure to light is discontinued, the exposed solution gradually becoming weaker until it possesses no diastasic power. This deleterious influence is confined to the rays of the violet end of the spectrum, the others being slightly favorable rather than destructive. Part of the solution so found to be affected by light-rays was kept in darkness and maintained its diastatic power unimpaired for more than a month, by which time the exposed portion of the solution, which had also been kept in darkness after an exposure of from two to eleven days, possessed no power to act upon starch. The experiments were performed on an extract of malt prepared by infusing ground malt with water or salt solution, and the results would seem to indicate the desirability of carefully protecting malt extracts from the action of light. A comparison of the diastasic power of fresh malt extract with that of similar material exposed in the pharmacy for varying periods suggests itself as an investigation of direct pharmaceutical and medical interest. At the same time it yet remains to be proved that the diastase is the chief or only active agent in malt extract. The coloring matter of the barley-husk has been proved to act as a screen which preserves the diastase from the destructive effect of light, whether it is dissolved in the extract made from malted barley or used separately as a screen placed before the cells in which exposure is made.—Pharm. Jour. Trans., 1894, 355, from Annals of Botany.

Crude Fibre—Estimation of.—V. Stein.—The method for estimating crude fibre in cereals is as follows: The finely ground sample is freed from carbohydrates by treatment with malt decoction and subsequent washing with water; it is then treated with cold aqueous soda (1 per cent.) after which it is washed and treated with 1 per cent. hydrochloric acid when it is allowed to settle. The residue is washed, transferred to a weighed filter (free from ash), washed with alcohol and ether, dried and weighed. Nitrogen and ash are determined, and the amounts deducted. The results obtained are higher than those furnished by the Weende method. Samples of barley were found to contain 9.26 to14.08 per cent. of crude fibre. —Exper. Stat. Record, 1894, 613.

Observations on Flours.—M. Belland.—After examining 250,000 samples of flour in the laboratory of the War Department, from September, 1891, to June, 1894, the author finds that the highest proportion of water is 16.20 per cent., and the lowest 9.40 per cent. The maximum of moist gluten was 47.5 per cent.; the maximum of fatty matter 3.10 per cent.; the minimum of acidity 0.013 per cent.—Compt. rend., vol. cxix., No. 14.

Sweet Cassava.—Harvey W. Wiley publishes in Bulletin 44, U. S. Department of Agriculture, Division of Chemistry, a study of this plant. Botanically it is known as Janipha manihot, Manihot utilissima, etc., etc. He summarizes as follows: Cassava can be cultivated with safety and profit in the greater part of the peninsula of Florida, and probably also in southern Alabama, Mississippi, Louisiana, and Texas. It will yield, with fair treatment, on sand soils, from four to five tons per acre. It will give, when properly manufactured, from 20 to 25 per cent. of the weight of the fresh root in starch of high grade. The starch is naturally in a pure state, and no chemicals of any kind are necessary in its manufacture. The starch resembles, in its physical properties, that of maize, and can be used as a substitute therefor in all cases. An excellent article of tapioca can be prepared from the starch of the cassava plant. Glucose can be prepared directly from the starch, or more profitably from the pulp of the peeled root. The plant furnishes an excellent human and cattle food, deficient, however, in nitrogen. It would make a well balanced ration for cattle when mixed with one-fourth its weight of cottonseed-oil cake.

Soxhlet's Areometric Estimation of Fat in Milk.—H. Timpe.—This deservedly popular process has one great inconvenience, namely, that the ether sometimes refuses to properly separate from the alkaline solution so that only a small amount can be drawn off. The author now recommends that the sample of milk should first be diluted with three volumes of water. The ethereal layer then separates with the greatest ease.—Chem. Zeit., 1894, 392.

The Cremometer.—P. Cazeneuve and E. Haddon find, from a series of careful experiments, that the indications of the cremometer are not trustworthy for samples of milk which have been Pasteurised at 98° to 100° with exclusion of air.—Jour. Pharm. Chim., 1895, 393.

Methods for Milk Analysis.—Official methods of analysis adopted by the Assoc. of Official Agricultural Chemists (America).—Reported in Chem. News, 1894, 5.

Preservation of Milk for Estimation of Fat.—M. Weibull adds from 60 to 100 Mg. of potassium permanganate to about 20 Cc. of milk which will then keep for several months at 64 to 72° F. Sufficient permangnate is added to produce a dark brown color, the milk being shaken until it is completely dissolved; the color disappears in a few days, when more permanganate is added. Comparative analysis with fresh milk and with milk

kept 6 to 56 days, gave results in which the greatest difference was 0.1 per cent. whilst in 8 out of 11 cases the difference was 0.5 per cent. or less.—Exper. Sat. Rec., 1894, 536.

Loss of Total Solids in Milk on Keeping.—E. J. Bevan accidentally noticed that milk placed in the usual weighing dishes will, if not soon evaporated, yield a residue which may be as much as 1 per cent. too low. If immediately before evaporation the milk is carefully neutralized with $\frac{N}{10}$ soda, the loss will not be so great, owing to the formation of a stable lactate. Contrary to Bell's statement, the author finds lactic acid to be sensibly volatile in the presence of water. The results of several experiments are tabulated, and show the disproportion between the acidity and the loss in total solids.—Analyst, 19, 241 ; Jour. Chem. Soc., 1895, 95.

Analyses of Milk.—J. Lehmann and W. Hempel.—The analyses relate chiefly to the ash associated with caseïn. The caseïn of cow's milk contains 7.2 per cent. of ash ; this consists of CaO, 49.5 ; MgO, 2.4 ; P_2O_5, 47.0 ; and SO_3, 1.06 per cent. The elementary composition of caseïn is thus given : C, 50.86 ; H, 6.72 ; N, 14.63 ; P, 0.81 ; S, 0.72 ; ash, 6.47 per cent. The caseïn of woman's milk contains more sulphur (1.09 per cent.) and less ash (3.2 per cent.).

The composition of milk is given thus :

	Cow's milk.	Human milk.
Caseïn	3.0	1.2
Albumin	0.3	0.5
Fat	3.5	3.8
Lactose	4.5	6.0
Ash	0.7	0.2
Water	88.0	88.5

—Pflüger's Archiv., 1894, 558 ; Jour. Chem. Soc., 1894, 360.

Calcium Phosphate in Milk.—L. Vaudin has studied the conditions under which calcium phosphate exists in milk, and finds that the latter contains an alkaline citrate which helps to retain the calcium salt in solution. The solution is due, however, to the part played by lactose, in the presence of the alkaline citrate. Every influence which tends to modify or destroy the molecular equilibrium of the salts dissolved in the milk, tends at the same time to precipitate calcium tri-phosphate with excess of the base in the form of citrate.—Compt. rend., cxx., 785.

The Preservation of Milk.—Villon recommends the use of oxygen under pressure, alone or mixed with carbonic acid. He has made a number of experiments on other fluids, and these suggested the possibility of the process being applied to milk. The fresh milk is submitted to oxygen under a pressure of two atmospheres. After several months the milk is found to be as fresh as when it was bottled.—Rep. de Pharm., 1894, 356.

Milk Fat Determination.—Krug and Stampe (Zeitschr. f. Angew.

Chem., 1894, 683) recommend the following method based upon the absorbent properties of kaolin, and the water-fixing quality of anhydrous sodium sulphate. The detail of the process is as follows: Five Cc. of milk are well incorporated with 7.5 Gm. of washed and freshly ignited kaolin, mixing them in a nickel evaporating dish of 200 Cc. capacity. When the kaolin and milk form a crummy mass, 5 Gm. of anhydrous sodium sulphate is added. All is again thoroughly mixed. The dry powder which results is transferred to a flask of 100 Cc. capacity, 25 Cc. ether is added; then the flask is securely corked, agitated for five minutes, allowed to settle, and 5 Cc. of this solution is pipetted off. In order to avoid contamination with kaolin, the tip of the pipette holds a small glass tube filled with absorbent cotton and kept in place by a short piece of rubber tubing. The ether is evaporated in a tared dish, and the residue of butter-fat weighed.

Effects of Heat on Milk.—Cazeneuve and Haddon consider that the result of numerous experiments conducted by them proves the yellow coloration of milk caused by heating to be due to oxidation of the lactose in the presence of alkaline salts. The lactose is converted into formic and other acids which coagulate the casein, the latter being unaltered except that it is colored yellow by substances formed at the expense of the lactose.—Compt. rend., 1895, 1273.

Analysis of Milk.—M. Weibull's process for the determination of the specific gravity of sour milk has been adversely criticised by Okulitsch. In reply, the author states that the process gives very satisfactory results if carried out exactly as follows: The sample is mixed with a known volume —about one-tenth of its bulk—of ammonia, and the whole is well shaken. After about an hour, when the contents have become quite fluid, the liquid is transferred to a graduated cylinder and measured. Its specific gravity is then taken, and after allowing for the specific gravity of the ammonia and the dilution, the specific gravity of the sample is found by a simple calculation. The fat is estimated by measuring the prepared sample in a pipette, so constructed that it will deliver exactly 7 Gms. of ammoniacal milk. This is then dropped on to a coil of filter paper (Adam's process), dried and extracted with anhydrous ether. If moist ether is used, some ammonium lactate will be dissolved. The weight of fat obtained is of course corrected for dilution.—Chem. Zeit., 1894, 926.

Citric Acid in Milk.—L. Vaudin shows that citric acid exists in cows' milk in the form of an alkaline citrate, which serves to keep in solution the calcium phosphate; and that the alkaline citrates and phosphates and calcium phosphate are present in the liquid in proportions which are relatively definite. Cows' milk contains from 1.0 to 1.5 Gm. of citric acid per liter, and mares' milk from 60 to 80 Cgm. per liter. Vaudin is of opinion that the acid is formed in the mammary gland at the expense of the lac-

tose, and that the citrogenic function of the gland, variable in different species, assures the partial solubility of the calcium phosphate contained in the milk.—Ann. de l'inst. Pasteur, viii. 502.

Formic Aldehyde in Milk.—R. T. Thompson finds that 8¾ grains of a 40 per cent. solution of formalin are quite as effective in preserving milk as four times that amount of boric acid, and the same proportion of salicylic acid, while the preserving power of benzoic acid is very low compared with what might be expected from statements made in text-books. It also seems peculiar that boric acid alone is much inferior to a mixture of boric acid and borax, so made up that each of these substances contributes equal to 17.5 grains of crystallized boric acid per gallon of milk.—Chem. News, 1895, 247.

A New Process for the Conservation of Fresh Milk.—Large cylinders are partly filled with the milk, after which oxygen is forced into the cylinders at a pressure of two atmospheres. This procedure entirely sterilizes the milk, which may then remain for months in the cylinders without undergoing any change. It can be sent on long voyages with perfect safety. When it is wished to use the milk the gas is allowed to escape, and the contents of the cylinder are then found to be just as sweet as when first put in.—Lyon Med., July 8, '94.

Caseïn of Human Milk.—A. Wroblewski.—The mean of analyses of the caseïn of human milk gives C, 45.01 ; H, 7.31 ; N, 15.07 ; P, 0.8 ; S, 4.7 ; O, 27.11 per cent. It differs from the caseïn of cow's milk in solubility, and in the fact that on peptic digestion it yields no residue of nucleïn.—Inaug. Diss., Ber., 1894 ; Jour. Chem. Soc., 1895, 54.

Kumyzoon is a variety of kumyss made from sterilized milk, without the addition of cane sugar, and may be kept almost indefinitely without change. It is said, therefore, to be practically free from alcohol and acetic acid. The lactic acid fermentation is induced by means of a special ferment.—Pharm. Jour. Trans., 1895, 1113.

Palatable and Digestible Milk.—Robert T. Edes gives a valuable way of preparing milk where other methods have not proved useful : A pint of milk is gently warmed. Into it is dropped very slowly and with constant stirring, about twenty minims of dilute hydrochloric acid. The milk should be stirred until it cools. In this way a very fine flocculent precipitate is produced, floating in the whey, which is easily accessible to the digestive secretions, while the whole fluid has lost somewhat of the flat and cloying taste which makes it unacceptable to so many. It will be noticed that milk prepared in this way differs from the various "wheys" in the highly important particular that the caseïn is retained and used, instead of being separated out as a distinct product, while it avoids the bitterness of pancreatinized milk.—Pharm. Era, 1895, 363.

Peptonized Beverage from Milk.—A. Bernstein claims to produce pepton-

ized milk by means of a specially prepared bacterium. The milk, buttermilk or whey is first completely sterilized, and a small quantity of the peptone bacteria, grown on agar, is added. After a few days the milk, if kept at about 20°, becomes more transparent and liquid. More milk may now be added, and the action of the bacteria continued for about a week. The milk is now boiled, which will cause the unaltered caseine to curdle, because a small amount of free acid has formed. The liquid is then filtered, heated for some time in an open vessel, and then kept for use in bottles. The bacteria may be obtained from milk by Koch's process. They exist as very short rods, two being generally connected together, and exhibiting rapid whirling motions; their colonies cultivated on plates of meat-peptone-gelatin are of a liquid, cloudy appearance, and soon liquefy gelatin completely.—Ibid., 302.

New Igniting Substance for Matches.—According to the Zeitsch. Ang. Chem., Simonet has succeeded in producing an entirely non-poisonous and harmless mixture for tipping matches, as follows:

Potassium chlorate	24 parts.
Potassium chromate	3 parts.
Barium sulphate	9 parts.
Antimony sulphide (Kermes)	3 parts.
Gum arabic	5 parts.
Zinc dust with a small percentage of amorphous phosphorus	9 parts.

—Nat. Drug., 1895, 113.

Constituents of Oyster Shells.—Chatin and Muntz have analyzed oyster shells, and find that they contain nitrogen (from residual organic matter), silica, calcium, sulphur (partly as sulphate), magnesium, manganese, iron, animal matter, fluorine, bromine and iodine, but not a trace of chlorine. The calcium and magnesium are combined with carbonic dioxide, and phosphoric acid was also indicated. It is suggested that the presence of these varied constituents accounts in great measure for the reputation enjoyed by oyster shells in agriculture and the ancient therapeia.—Comp. rend., cxx., 531.

Proteïds of Egg-White.—R. T. Hewlett. The so-called globulin of white of egg gives most of the reactions of nucleo-albumin, but phosphorus determinations have yet to be made to confirm the supposition. With regard to the albumin, not only does fractional heat coagulation suggest the presence of two or more proteïds, but fractional precipitation by ammonium sulphate tends in the same direction; moreover, some of the fractions are precipitated by both normal and tribasic lead acetate, others only by the latter. Ramsden found that prolonged heating for days brings down albumins at temperatures considerably below their usual coagulation point. If thymol had been used as an antiseptic in these experiments, a source of error was introduced, as this substance and, to a less degree, camphor, precipitate proteïds slowly.—Proc. physiol. Soc., 1894, 9.

Proteïds of Wheat.—Osborne and Voorhees have separated from the wheat kernel five distinct proteids—gliadin, glutenin, a globulin, an albumin, and a proteose, besides a proteose-like body. Both gliadin and glutenin appear to be necessary for the formation of gluten, but those substances alone are requisite, and no ferment action seems to be involved in the process.—Journ. Amer. Chem. Soc., xvi., 524.

Vegetable Proteïds.—W. Palladin.—An examination of the various vegetable proteïds described by Weyl, Vines, Martin, Green, Chittenden, Osborne and others, leads the author to the following general conclusions:

1. Plant-vitellin has many of the properties of albumoses.
2. Plant-myosin is only a calcium compound of vitellin.
3. The existence of vegetable albumoses soluble in water is questionable.
4. Vegetable proteids are accompanied by still unknown nitrogenous substances.
5. The number of hitherto described vegetable proteids is greater than the number which really exists in the plants.—Zeit. Biol., 1894, 191; Jour. Chem. Soc., 1894, 631.

Densimetric Estimation of Proteïd.—T. Lohnstein.—The proposed method is briefly this: The volume v of a concentrated solution of sodium hydroxide is brought to the volume V by dilution with distilled water; the proteïd solution contains p Gm. of albumin per 100 Cc.; of this solution a volume equal to V is taken, and the proteïd precipitated; the coagulum is well washed and dissolved in v Cc. of undiluted sodium hydroxide, with heat if necessary; this is diluted up to V. The sp. gr. of the sodium hydroxide solution is noted, and that of the one containing alkali albumin; the two solutions differ by $\frac{p}{100}$ V gram proteïd. If S_1 = the sp. gr. of the sodium hydroxide solution, and S_2 that of the sodium hydroxide solution of albumin, then $S_2 = S_1 + \beta p$, and $p = \frac{1}{\beta}(S_2 - S_1)$. For the method of estimating the co-efficient $\frac{1}{\beta}$ the original paper must be consulted; its mean value is given as 402.45.—Pflüger's Archiv., 1895, 479; Jour. Chem. Soc., 1895, 192.

Oxidation of Proteïds by Potassium Permanganate.—S. Bondzynski a L. Zoja.—Maly described, as the product of oxidation of egg-white by potassium permanganate, a substance, oxyprotosulphonic acid, in which the amounts of carbon and nitrogen are approximately in the same proportion as in albumin. In the present research, this substance was prepared from pure proteïds—crystals of egg-albumin and of oxyhæmoglobin. In the case of caseïn, which differs from albumin in containing phosphorus in its molecule, the results of analyzing fractions of the oxidation product show it to consist of two substances.—Zeit. f. physiol. Chem., 1894, 225.

Influence of Certain Proteïds on Solutions of Glycogen—H. Schwiening. —Sugar often forms in solutions of glycogen mixed with proteïds, and the

hypothesis has been advanced that the proteïd is the source of the ferment. In the present research, various forms of proteïd were added to solutions of glycogen, but the results were most irregular, and do not settle the question, as sugar sometimes appeared in the sterilized, sometimes in the unsterilized, samples.—Pflüger's Archiv., 1894, 222; Jour. Chem. Soc., 1895, 124.

Phosphorus in Digestion Products of Caseïn—W. v. Moraczewski.—A series of five experiments show that the amount of phosphorus in the nucleïn left after the digestion of caseïn by artificial gastric juice is variable, and that all the phosphorus of the caseïn is not in the form of nucleïn; from 6 to 60 per cent. of the phosphorus is present in this form. The caseïn of human milk contains phosphorus, but no nucleïn.—Zeit. f. physiol. Chem., 1894, 28.

Coagulation of Proteïds by Mechanical Means—W. Ramsden.—By mechanical means, such as shaking with sand, or even pouring from one test tube to another, a solution of egg-white deposits insoluble proteïd, reminding one of fibrin filaments, which also it resembles in its difficulty of solubility. By prolonged shaking, 96 per cent. of the proteïd present was separated. Other proteïds behave similarly, but, as a rule, in a less degree, namely, egg globulin, vitellin, the proteids of blood plasma, myosinogen, potato proteïd, plant vitellin, alkali albumin, and some specimens of caseïnogen.—Jour. Chem. Soc. (abs.), 1895, 254.

Adulteration of Commercial Peptones.—L. Hugounenq, in the examination of some samples of commercial peptone, found two which reduced Fehling's solution, and on further examination proved to contain about 33 per cent. of milk sugar. That the sugar present was lactose was confirmed by the examination of the ozazone prepared from it. The total nitrogen of one of the samples amounted to 8.34 per cent., while a good sample of unadulterated peptone yielded 12.72 per cent.—Jour. Pharm. Chim., 1895, 178.

Development of the Latent Photographic Image by Alkali Peroxides.—G. A. LeRoy.—Aqueous solutions of alkali peroxides, or a solution of hydrogen peroxide made strongly alkaline, can develop the latent image formed when emulsions of silver bromide or silver chloride in gelatin are exposed to light—the intensity of reduction being sensibly proportional to the quantity of light acting on the emulsion. The developing power of the alkali peroxides is, however, much below that of the substances usually employed as developers by photographers. The image, which consists of a mixture of metallic silver and silver oxides, is considerably reduced in intensity when placed in solutions of alkali thiosulphates or thiocyanates. —Compt. rend., 119, 557.

Developing Gelatino-Chloride Paper.—S. H. Fry's process of developing gelatino-chloride paper or prints, is as follows (Anthony's Phot. Bull, 1894,

306): The prints are exposed, so as to render the image slightly visible, and are then placed in a bromizing solution (Potassium Bromide, 1 fl. oz. Water, 10 fl. oz., for about fifteen minutes. They are then thoroughly washed and developed in the following solutions:

a—Hydroquinone	1 oz.
Sulphurous Acid	¼ fl. oz.
Sodium Sulphite	¼ oz.
Potassium Bromide	60 grains.
Water	to make 25 fl. oz.
b—Caustic Soda	¼ oz.
Sodium Sulphite	½ oz.
Water	to make 25 fl. oz.
c—Ammonium Bromide, Ammonium Carbonate	of each, 1 ounce.
Water	to make 25 fl. oz.

Take equal parts of each. Development should be stopped when the details in the high lights begin to show, as the image rather gains than loses subsequently. The prints are then thoroughly washed, to get rid of all developer, and may then be toned in the usual toning-baths. The prints, when they leave the developer, are of a brick-red color, and are said to tone readily.

Photography in Natural Colors.—A. and L. Lumière point out that the indirect method of photographing in natural colors has not received a proper practical application because of the difficulty experienced in selecting the colors and in preparing and superposing the monochromes. They recommend the use of orange, green and violet screens for preparing three series of negatives presenting a maximum of sensibility to the rays which the respective screens allow to pass. Specimens of photographs were exhibited before the Paris Academy of Sciences. The printing and superposition of the monochromes have been successfully accomplished by employing bi-chromated gelatin, to which are added substances insoluble under certain conditions. If, for example, 5 per cent. of ammonium bichromate and 5 to 10 per cent. of silver bromide in the form of emulsion be added to a 10 per cent. solution of gelatin, and the preparation be spread in a thin layer upon a plate of glass, a surface is obtained which can be exposed under a negative and will reproduce the picture by the action of light. After exposure, the plate is washed with cold water, and the portion of the film acted upon by light, being rendered insoluble, remains and serves to print the image form on the application of suitable colors. The silver bromide, which may be replaced by other insoluble precipitates, is easily removed by the action of sodium hyposulphite, and proofs can then be printed from the plate in any color, showing all the graduations of tint present in the negative. Polychrome prints may be obtained by receiving on the same plate monochrome red,

yellow, and blue images successively, by means of three corresponding negatives, and isolating each image from the preceding one by an impervious layer of collodion. By employing dyes of greater or less concentration, or by simple decoloration with water, variation in the relative intensity of the monochromes is readily obtained.—Compt. rend., 1895, 875.

Phosphorescence.—H. Jackson finds that many substances which are phosphorescent remain so when prepared in as pure a condition as possible, but the brilliancy of the phenomenon is influenced by the method of preparation of the compounds. Thus, lime prepared from pure precipitated calcium carbonate in the crystalline condition was strongly phosphorescent, but when the carbonate was rapidly treated while in the amorphous condition, the lime from it hardly glowed at all. Similarly variable results were obtained in the case of barium carbonate, and it would, therefore, appear that, "according to the conditions of its preparation, an apparently pure substance may or may not phosphoresce, or the color of its glow may not always represent rays of the same range of wave length."—Journ. Chem. Soc., ccclxxx., 734.

Analysis of India-rubber Wares.—R. Henriques gives further (see Proc. 1893 and 1894) instructions for the analysis of rubber wares. Adulteration with fatty matter or fatty surrogate may be detected by treating a weighed quantity of the sample with alcoholic soda, as previously described, and noticing the loss in weight. If the sample contains much added mineral matter, it is best to first treat it with moderately strong acid before boiling with the alkali; as the latter dissolves small quantities of rubber, a correction must be made by deducting from the weight of the surrogate a quantity corresponding with 2.5 per cent. of the rubber actually found; soluble sulphur is, of course, allowed for. Asphalt, whether true bitumen or the artificial product, is another adulterant. In the absence of surrogate, 1 Gm. of the finely divided sample is soaked for an hour in 30 Cc. of nitrobenzene. The insoluble mass is thrown upon a filter, gently pressed with a small pestle, and further washed with another 30 Cc. of the solvent; the mass is then transferred by means of a wash-bottle to a porcelain dish and boiled with water until all odor of nitrobenzene has disappeared; it is then dried and weighed. As rubber is not altogether insoluble in nitrobenzene, a correction must be made by deducting 2.5 per cent. from the asphalt for true rubber dissolved; soluble sulphur must also be allowed for. If the sample contains also surrogate, this must be first removed by treatment with alkali, in which asphalt is practically insoluble. The process becomes still more complicated if, besides asphalt, lamp-black is also present; this withstands the action of all ordinary solvents, and remains in consequence with the rubber. The author has found that in pure rubber there is a fairly constant atomic relation between the hydrogen and the carbon, which may be taken as

16 : 10. The residue containing the rubber + the lamp-black is therefore submitted to an organic combustion, and any excess of carbon put down to lamp-black.

The test analyses given by the author are remarkably satisfactory considering the nature of the analysis. The process does not, as yet, provide for a host of other possible adulterants.—Chem. Zeit., 1894, 411.

Analysis of Rubber Goods.—C. O. Weber has given an interesting process for the analysis of rubber goods. It may be briefly described as follows: The finely divided sample is first treated with acetone, which dissolves fatty and sulphurized oils, mineral oils, rosin oil, natural and added resins, paraffins, free, and in part combined sulphur. The residue is exhausted with boiling alcoholic soda which dissolves the oil surrogates known as faktis and any sulphur or chlorine contained therein. After drying, the mass is extracted with cold nitrobenzene, which dissolves asphalt and any sulphur therein contained. The extraction is then repeated with boiling nitrobenzene, which dissolves the rubber and any vulcanizing sulphur. After this, the residue is boiled with water, and the solution tested with starch, whilst the insoluble matters will now consist of the mineral matter with any lamp-black and a little sulphur. As it is not practicable to recover the dissolved matter from the alcoholic soda or the nitrobenzene, the insoluble matter must each time be weighed. The adhering nitrobenzene may be easily removed by washing with benzene. The author also gives a delicate test for the presence of red-lead. The finely-ground sample is moistened with a solution of aluminum chloride in ether, and then heated in an air-bath for two hours at 120°. If red-lead is present the rubber becomes hard and brittle and emits an odor of chlorine.—Chem. Zeit., 1894, 1003, 1040.

Analysis of India Rubber.—R. Henriques, in reply to Terry and L. Bruyn, states that an appreciable loss of india-rubber is caused by the solubility of the same in alcoholic alkali. The alcohol should, therefore, always be expelled and the residue treated with water.—Chem. Zeit., 1894, 905.

The Cleansing Action of Soap.—F. Kraft and A. Stern criticise the view put forward by Rotondi and others, that when soap is acted on by water it is decomposed into an acid soap which is almost insoluble in hot water, and a basic soap which remains dissolved. It follows from the experiments described that when a soap is dissolved in a large amount of hot water, the sodium salts of palmitic, stearic, and elaïdic acids separate out, along with an amount of the free acid which varies with the amount of water used, whilst the liquid contains free alkali and the sodium salt of oleïc acid. No evidence of the existence of basic salts of the soap acids has been brought forward by the supporters of the theory, and none could be experimentally obtained by the authors.—Ber. d. Chem. Ges., 1894, 1755.

The Twitchell Method for Estimating Rosin in Soap.—T. Erans and I. E. Beach have noticed that rosin generally contains from 6–9 per cent. of unsaponifiable matter, which, no doubt, accounts for the indifferent results obtained by some investigators when using Twitchell's process for the estimation of rosin in a mixture of the same with fatty acids. To render the process a really good one, from a soap manufacturer's point of view, a good method for the estimation of this unsaponifiable matter will have to be discovered.—Amer. Chem. Jour., 1895, 59.

Gladding's Process for Estimating Rosin in Soap.—L. Archbutt.—This process is seriously interfered with by the presence of unsaponified fat. Gladding's directions as regards this matter are not stringent enough, and the author therefore advises either to boil the sample with excess of alkali, or to remove the fat from its aqueous solution by shaking with ether. The soap thus purified is then decomposed with acid and the liberated fatty acids treated according to Gladding's directions.—Analyst, 1895, 6.

Detection of Soap in Lubricants.—H. Schweitzer (Chem. and Drug., xlv., 845), points out a new method of detecting soap in lubricants. The reaction is based on the fact that metaphosphoric acid is soluble in alcohol and ether, while its salts of most of the alkalies and alkaline earths are insoluble. The ammonium salt, however, is soluble; but as ammonia soap is rarely, if ever, found, that fact may be neglected, and in doubtful cases, special search may be made for ammonia. If, then, to a solution of the oil in benzene or other solvent, a saturated solution of metaphosphoric acid in absolute alcohol be added, the calcium, sodium, potassium, or aluminum salts will be at once precipitated if those soaps be present. When benzene is the solvent, ozokerite and certain waxes are precipitated on the addition of the reagent in alcohol, and in that case both oil and reagent must be dissolved in ether. The reagent gives no precipitate with any of the common animal, vegetable, or mineral oils, when pure; but if even a trace of soap be present, a cloudiness will at once appear. Lubricants containing soap should not be used in places where steam or moisture is present, as the water precipitates the soap. Further, in cold weather the soap gelatinizes, and renders the lubricant useless, and the presence of soap has a tendency to considerably raise the temperature of the bearings to which the oil is applied, and also increases the friction to a very large extent—in one case the author was informed of, this occurred to such an extent that machinery where it was used, which was driven by water power, was brought to a stand-still.

Bacteriological Examination of Potable Water.—E. Malooz discusses the relation between the presence of microbia and pollution by nitrites and ammonia. He has observed that though the absence of nitrites and ammonia is no proof of the bacteriological purity of water, yet inversely nitrites and ammonia are almost invariably present only in waters contain-

ing many bacteria of various kinds. Concerning the presence of bacterium coli in water, the author has observed that this micro-organism is present in water only when pollution by the soil or the air is probable. The presence of bacterium coli allows us to infer a contact, direct or indirect, of the water and human excreta. The author rejects the determination of the sum total of microbia present, as it throws no light on the properties of the water, and may give scope to misinterpretations. It was concluded that the hygienic value of a water, as regards its total number of micro-organisms, depends on local conditions, such as the source of water, the method of its conveyance to the place of consumption, the character of the soil, etc.—Chem. News, 1894, 149.

Calcium Permanganate for Purifying Water.—Bordas and Girard suggest the employment of calcium permanganate for the purification of drinking water, since the use of this salt obviates the introduction of a foreign soluble salt, as when the permanganates of sodium or potassium are employed. To remove an excess of calcium permanganate, the lower oxides of manganese are used, which reduce the permanganate to the insoluble binoxide. Water thus treated contains neither dead organic matter nor living organisms; but contains a little calcium carbonate and minute traces of peroxide of hydrogen, which tend to assure the asepsis of the fluid.—Compt. rend., 1895, 689.

Iodine as a Sterilizer of Water.—According to Meillere (Rép. de Pharm., vii, 5), we can, by means of iodine, extemporaneously sterilize water destined for either washing or drinking purposes. Four drops of tincture of iodine are sufficient to sterilize, in a few minutes, one liter of spring water. This water still produces cultures in a peptone bouillon, but the pathogenic species are destroyed. Iodized water would sometimes be contra-indicated, as in pregnancy, lactation, etc.; but its disadvantages are not to be compared to the danger one risks in drinking contaminated water. During the time of epidemics one could advantageously make use of this method for the sterilization of water. The quantity of iodine added could be increased in case the water is to be used for the toilet, lotions, injections, foot-baths, etc.

Mollusks as Purifiers of Water.—Charles Hedley.—A use, novel to him, of pond snails by the Chinese silk growers is described in an official work which caught his eye by chance. The water used for reeling silk is taken from mountain streams, as being the cleanest; the water from wells is never used, and if mountain water cannot be had, river water is taken, which is cleaned by putting a pint of live shellfish to one jar of water. There is a special kind of shellfish, called the pure water shellfish, found everywhere in ponds, wells and creeks. They first of all sink to the bottom of the jar, and then by degrees make their way up its sides, consuming gradually all impurities in the water within half a day or so. After the clean water has

been drawn from the jar, the shellfish are cleaned and put to the same duty again.—Pharm. Era, 1895, 333.

Purification of Water by Green Plants. — The prevalent idea that green flowering plants and algæ, growing in running water, add to its impurity and unfitness for drinking purposes, has long been shown to be erroneous. As long as they are in a growing condition they can only tend to purify the water by giving out oxygen to it. T. Bokorny maintains that aquatic bacteria also have a share in the purification of the water as long as it contains a considerable quantity of organic matter. A series of experiments carried on by the author showed that algæ are capable of decomposing fatty acids, such as butyric and valerianic, as also glucose, lucin and tyrosin.—Arch. f. Hygien, 1894, No. 2; Pharm. Jour. Trans., 1894, 356.

Impurities in Snow.—Another example is given of the incorrectness of the idea that an excellent substitute for distilled water is to be found in melted snow. In a lecture on "The Chemistry of Cleaning," delivered by Vivian Lewes, he described the result of this process as applied to snow from the roof of an orchid house at Chelsea. The solid impurities were as follows:

Carbon	39.6	per cent.
Hydrocarbons	12.3	"
Organic bases	1.2	"
Sulphuric acid	4.33	"
Hydrochloric acid	1.33	"
Ammonia	1.37	"
Metallic iron and magnetic oxide	2.63	"
Other mineral matter, chiefly silica and ferric oxide	31.24	"

—Brit. and Col. Drug., 1894, 191.

Iron in Water.—A. Zega proposes the following method for a colorimetric estimation of iron in water. To 100 Cc. of the water (in which the iron has already been oxidized to the ferric condition) 1 Cc. of nitric acid (sp. gr. 1.35 to 1.40) and 5 Cc. of a 5 per cent. solution potassium thiocyanate, are added. The coloration develops rapidly and does not darken on remaining. 100 Cc. of distilled water is then similarly treated, and a standarized solution of a ferric salt containing 0.01 Mgm. of iron per Cc. run in until the coloration produced is equal to that in water under examination. The quantity of ferric solution added represents, of course, the quantity of iron in the water. In this way 0.01 Mgm. of iron per 100 Cc. of water is easily estimated.—Chem. Zeit., 1894, 1564.

Nitrites in Potable Waters.—P. L. Aslanoglon is attempting to elucidate: (1) How long nitrous acid and nitrites in very weak solutions, as in waters, take to be oxidized by free oxygen. (2) Whether very dilute

nitrites are decomposed by carbonic acid. (3) Whether and under what circumstances, metals, such as iron, zinc or lead, can reduce nitrates to nitrites; also the action of ferrous hydroxide. (4) The stability of ammonium nitrite in the absence of oxygen.—Chem. News, 1894, 236.

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methods of inoculating agar-agar, potato, gelatin, etc., with various forms of bacillus and staphylococcus, as well as sarcina, aspergillus, and torula. Instructions are also given for studying the action of light, oxygen, and heat in the growth and metabolism of bacteria. In the next lesson several of the types are further studied and instructions given for staining them with simple basic aniline dyes—fuchsine, gentian-violet, and methylene-blue. Hanging drop cultures and pus are next examined and stained with Löffler's methylene-blue and by Gram's method. A specific form—bacillus anthracis—is then taken and studied in considerable detail, occupying the major portion of four lessons. Acid formation, methods of attenuation, asporogenous cultures, impression specimens, examination of fresh tissues, plate culture method, staining of spores, and staining of tissues in frozen sections all receive attention, and are dealt with in a thoroughly practical fashion. In subsequent lessons the organisms associated with cholera, actinomycosis, typhoid fever, pneumonia, diphtheria, leprosy, tuberculosis, glanders, tetanus, etc., are considered, numerous minor operations being described in the course of the work, and, lastly, attention is directed to phagocytosis and chemiotaxis. The second part contains twelve lessons, and detailed instructions are there given for the examination of water, milk, air and dust, soil, decomposing meat, ice cream, antiseptics and disinfectants, animals dead of bacterial disease, and filters. The ten lessons in part III. deal with the preparation of metabolic products of micro-organisms, proteïnes, bacterial pigments, peptones, albumoses, diphtheria toxin, ferments, enzymes and ptomaines.

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Vol. 5: Parts 1 and 2, Pyrenomycetes, by Messrs. J. B. Ellis and B. M. Everhart. Vol.

9: Part 1, Hepaticæ, by L. M. Underwood. Vol. 10: Part 1, Typhaceæ, Sparganiaceæ, Naiadaceæ, Juncaginaceæ, Alisinaceæ, Hydrocharitaceæ by the late Thomas Morong. Vol. 11: Parts 1 and 2, Cyperaceæ, by N. L. Britton and L. H. Bailey.

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——— C. W. Scheele. (Alembic Club reprints, No. 8.)

Manual of Chemistry. A Guide to Lectures and Laboratory Work for Beginners in Chemistry. A text-book specially adapted for students of pharmacy and medicine. By W. Simon. Fifth edition. In one octavo volume of 502 pages, with 44 engravings and 8 colored plates, illustrating 64 of the most important chemical tests. Philadelphia: Lea Brothers & Co., 1895.

Chemistry: General, Medical and Pharmaceutical, Including the Chemistry of the U. S. Pharmacopœia. A manual of the general principles of the science, and their applications in medicine and pharmacy. By John Attfield. Fourteenth American Edition. Philadelphia: Lea Brothers & Co., 1894.

Text-Book of Medical and Pharmaceutical Chemistry. By Elias H. Bartley. Third edition, revised and enlarged. With eighty-four illustrations. Philadelphia; P. Blakiston, Son & Co.

Agendi du Chimiste pour 1895. Paris: Hachette et Cie.

Leçons de Chimie à l'Usage des élèves de Mathématique spéciales. 2. Ed. H. Gauthier et G. Charpy. Paris: Gauthier-Villars et Fils.

A Text-Book of Chemistry. S. P. Sadtler and Henry Trimble. Philadelphia: J. B. Lippincott Company.

This is a work of 950 pages and intended for the use of pharmaceutical and medical students. Part I. treats of Elementary Physics, which for the ground covered is well executed. Part II. deals with the Chemistry of the Non-Metals and contains a chapter on chemical reactions and equations, laws of combination by weight and volume, etc. It also contains many practical exercises for the use of the student in the store or laboratory. The Non-Metals as well as Metals in Part III. are considered as regards history, occurrence and formation, preparation, properties, uses, detection, with an account of the official

preparations and all necessary information relating thereto. Part IV. treats of Organic Chemistry, containing an introduction chapter, also chapters devoted to open-chain or aliphatic hydrocarbons, derivatives of the same, closed-chain groups with less than six carbon atoms, closed chain or aromatic compounds, aromatic compounds containing one nucleus, aromatic compounds with more than one nucleus, alkaloids and ptomaines, the terpenes and their derivatives; glucosides, bitter and neutral principles and tissue-forming substances or proteid matter. Part V. is a consideration of analytical chemistry (qualitative and quantitative) and pharmaceutical assaying.

A New System of Chemical Notation and Nomenclature. T. K. Gajjar. Bombay: The Education Society's Steam Press. The author proposes an international notation based on the Periodic Law of Newlands and Mendeleeff, and applies to those symbols in he Devangari dialect, with their equivalents in English; the numerals are also designated by a system of vowel sounds.

Traité de Chimie légale. Analyse toxicologique. Recherches spéciales. E. Barillot. Paris: G. Masson.

Simple Experiments for Science Teaching. J. A. Bower. New York: E. & Y. B. Young & Co. This includes 200 experiments fully illustrating the elementary physics and chemistry division in the evening school continuation code.

Geschichte der Chemie von den ältesten Zeiten bis in die Gegenwart. E. von Meyer. Zugleich Einführung in das Studium der Chemie. 2te verbesserte u. vermehrte Auflage. Leipzig: Veit & Co.

Chemie médicale. Corps minéraux. Corps organiques. L. Garnier. Paris: Rueff et cie.

Nozioni di Fisicia, Chimica e Minerâlogia ad Uso delle Scuole techniche e delle Preparatorie alle Normal. M. Borzone. Torino.

Der Monismus der Chemischen Elemente. Ed. Miensel. The author claims that "chemical research culminates in the question of the nature and origin of the elements." He attempts to prove that "the atoms of the various elements have arisen only by different condensation, by dissimilar occupation of space and unequal quantitative accumulation." He attempts to prove that present known 75 elements are all formed from one form-primitive—matter. He calculates for hydrogen the weight of a single particle (molecule?) 0. 000 000 000 000 000 000 000 004 Gm. An atom of the primal matter would, therefore, weigh the 200th part of this amount.

Jahresbericht über die Fortschritte der Chemie und verwandter Theile anderer Wissenschaften, herausgegeben von F. Fittica. Für 1889. 6 Heft. (S. 2401–2880.) Braunschweig: F. Vieweg u. Sohn.

Roscoe-Schorlemmer's kurzes Lehrbuch der Chemie nach den neuesten Ansichten der Wissenschaft. H. E. Roscoe u. A. Classen. 10 Aufl. Braunschweig: Fr. Vieweg u. Sohn.

Synopsis of Advanced Chemistry. W. J. Stainer. London: Clive. This is arranged according to the syllabus of the advanced stage, science and art department, South Kensington.

Das Atomvolumen in chemischen Verbindungen. E. Mensel. Liegnitz: Ewald Scholz.

Encyklopädie der Naturwissenschaften. 2. Abth. 85 Lief. Handwörterbuch der Chemie. 65 Lief. Breslau: Ed. Trewendt.

Grundzüge der mathematischen Chemie. Georg Helm. Leipzig: Wm. Engelmann. The author discusses the transformation of energy by reason of chemical action.

Kurzes Repetitorium der Chemie. 1. Theil Anorganische Chemie. 2. Aufl. Ernest Bryk. Wien: M. Breitenstein.

Grundzüge der Chemie und Mineralogie für den Unterricht an Mittelschulen. M. Zaengerle. 3. Aufl. München: J. Lindauer.

ANALYTICAL CHEMISTRY.

Analisi volumetrica applicati ai produtti commercieli, e industrialia. P. E. Alessandri. Milano: M. Hoepli.

Reactionen und Reagentien. C. Schueller. 1. Bd. Eichstätt: A. Stillkrauth. A handbook for physicians, analysts, apothecaries and chemists. The author has arranged the work in the nature of a lexicon, giving the names of the original authors and comprises a general review of the application and use of the important reagents, etc.

Reactionen und Reagentien. K. Schneller. 2 Bd. Eichstätt: A. Stillkrauth.

Select Methods in Chemical Analysis (Chiefly Inorganic). W. Crookes. 3d Ed. Re-written and enlarged. New York: Longmans, Green & Co.

Logarithmische Rechnentafeln für Chemiker. F. W. Küster. Leipzig: Veit & Co. This work is intended for use in laboratory instruction with elucidations.

Qualitative Analysis. L. Medicus. Translated by J. Marshall. Philadelphia: J. B. Lippincott. For use in instruction in chemical laboratories.

Electro-Chemical Analysis. E. F. Smith. 2d Ed. Philadelphia: P. Blakiston, Son & Co. The author brings this valuable work up to date, including references to the work of the Munich Polytechnic School, Elbs and Oettel, and his own work and that of his pupils.

The Decomposition of the Fixed Alkalies and Alkaline Earths. By Humphrey Davy, 1807–1808. (Alembic Club Reprint, No. 6.) Edinburgh: W. F. Clay.

Speed of the Liberation of Iodine in Mixed Solutions of Potassium Chlorate, Potassium Iodide and Hydrochloric Acid. H. Schlundt. Univ. of Wisconsin, Madison, Wis.

Laboratory Exercise Book for Chemical Students. E. Francis. London: Blackie. Contains tables for analysis; sheets for results.

Elementary Practical Chemistry, Inorganic and Organic. J. T. Hewitt and F. G. Pope. London: Whittaker.

Travole di analisi chimica qualitativa. M. Fileti. 5 a Ediz. Torino.

Electrochemische Analyse. E. F. Smith. Uebersetzt von M. Ebeling. Berlin: Weidmann.

Chemical Analysis of Oils, Fats and Waxes, and of the Commercial Products Derived Therefrom. R. Benedikt. From the German. Revised and enlarged by J. Lewkowitsch. London: Macmillan.

Manuel des Manipulations chimiques ou de chimie Opératoire. Fr. De Walgue. 4 e édit. enriché de 388 grav. et d'un tableau coloré. Loewen: Uystpruyst-Dieudonné.

Agricultural Analysis. W. H. Wiley. Edinburgh: W. F. Clay.

Katechismus der Stöchumetric. A. Frickhinger u. H. Frickhinger. Mit besonderer Rücksichtnahme auf die Bedürfnisse der Studirenden der Pharmacie, Medicin und Technik. 6. Aufl. München: C. H. Beck.

A Text-Book of Volumetric Analysis, with special reference to the volumetric processes of the Pharmacopœia of the United States, designed for the use of pharmacists and pharmaceutical students, by Henry W. Schimpf. New York: John Wiley & Sons, 1894.

Einführung in die qualitative chemische Analyse. U. Kreusler. Bonn: Ed. Weber (Jul. Flittner).

Electro-chemie. Ihre Geschichte und Lehre. W. Ostwald. Leipzig: Veit u. Co.

Anleitung zur qualitativen chemischen Analyse. C. R. Fresenius. Für Anfänger und Geübtere bearbeitet. Mit einem Vorwort von Justus v. Liebig. 16te neu bearbeitete und verbesserte Auflage mit Holzstichen und einer farbigen Tafel. Erste Abtheilung. Braunschweig: F. Vieweg u. Sohn.

Die Analyse der Weine. H. A. Blücher. With 13 woodcuts. Kassell: M. Brunnemann. This work contains the latest methods in manufacture of wines, as well as tables of results and reduction tables.

Ueber das Spectrum des Kaliums, Natriums und Cadmiums bei verschiedenen Temperaturen. J. M. Eder und E. Valenta. Leipzig: G. Freytag.

Notes on Reactions of Salts, and Scheme for the examination of a solution of a single Salt. Class of practical chemistry, University of Edinburgh. Thin (Edinburgh): Simpkin.

Chemische Reagentien und Reactionen. Ein Hülfs und Nachschlagebuch für Apotheker und Chemiker bei Analytischen Arbeiten. Von C. Dünnenberger. Zürich Art. Institut: Orell Füssli.

Die wissenschaftlichen Grundlagen der Analytischen Chemie elementar dargestellt. W. Ostwald. Leipzig: W. Engelmann. Small 8vo, pp. 187. This work in the scientific foundations of analytical chemistry consists of two parts: Theory and Applications. The author considers the theory of solutions, chemical equilibria, the course of chemical procedures, reactions with the liberation or absorption of gases, and the influence of the conditions of the ions. Also the measurement of substances quantitatively. The author also gives the general principles for the analysis of compounds belonging to the groups of the system of Mendeleeff and to the non-metals.

Einfache Versuche für den Unterricht der Chemie. B. Tollens. Zweite, durchgesehene Auflage. Berlin, S. W.: Paul Parey.

Einführung in das Studium der qualitativen chemischen Analyse. 8. Auflage. C. Friedheim. Berlin: Carl Zabel.

Lessons in Qualitative and Volumetric Analysis. For the use of physicians, pharmacists and students. By C. O. Curtman. Including lessons in qualitative chemical analysis by F. Beilstein. 4 ed., revised and enlarged with many illustrations. Pp. XIV. and 295. St. Louis.

In addition to what previous editions have contained, the author prefaces his books with the following:

"The portion based upon F. Beilstein Anleitung conforms to such changes as have been made in the latest German edition, and to illustrate the compounds not described there, the number of examples has been increased. To call attention to the characteristic reactions of analytical groups, notes have been inserted, which also give directions for furnishing the student with specimens for practice in the detection of unknowns."

"New tables have been added to this portion and others enlarged, and the charts illustrating the spectra have been increased and rendered more complete."

"To the systematic course on qualitative analysis, a chapter on reagents has been appended."

"In the section on examples for practice in analysis of organic substances, a number of additions will be found (starch, salol, anilin, acetanilid, antipyrin, phenacetin, caffeine.)"

"The section on volumetric analysis has been entirely rewritten. Besides a description of volumetric apparatus and processes it contains numerous examples, illustrating every important volumetric method, and now forms a complete commentary on the volumetric assays of the new U. S P., giving full instructions for the examination of every preparation for which a volumetric test has been directed in that work, including gasometric determinations. A number of illustrations have been introduced, representing apparatus used in volumetric, gasometric, and colorimetric works."

"The chapter on examination of drinking water has been recast, and embodies the recent advances made in this important field of hygienic investigations." "Much care has been bestowed upon the section of analysis of urine. Modern methods of investigation have been inserted and many notes added, pointing out the diagnostic value of the results of analysis."

"The orthography has been adapted to the rules of the chemical section of the A. A.

A. S. The addition of nearly one hundred pages is due entirely to the introduction of new matter."

Tables and Directions for the Qualitative Chemical Analysis of Moderately Complex Mixtures of Salts. M. P. Mint. London: Longmans, Green & Co.

Problèmes de Physique et de Chimie. P. Banet-Rivet. Paris: Hachette et Cie.

Traité de Chimie analitique minérale qualitative et quantitative. L. L. de Koninck. Paris: Baudry et Cie.

INORGANIC CHEMISTRY.

Text-Book of Inorganic Chemistry. G. S. Newth. London and New York: Longmans, Green & Co. Crown 8vo., pp. 667.

In his "Introductory Outlines" the author treats of dissociation, electrolysis, periodic system and thermo-chemistry. In Part II. the four typical elements, hydrogen, oxygen, nitrogen and carbon, with their important elements, are considered. In Part III. the author takes up the elements (omitting the rarer elements) according to the periodic system.

A Treatise on Chemistry. H. E. Roscoe and Schorlemmer. London and New York: Macmillan. Vol. I. Non-metallic Elements. New edition, completely revised by H. E. Roscoe, assisted by H. C. Coleman and A. Harden, with 374 illustrations and a portrait of Dalton.

Anleitung zur Darstellung Chemischer Anorganischer Präparate für Chemiker und Pharmaceuten. R. Blockmann. Leipzig; Veit u. Co.

Lehrbuch der anorganischen Chemie. F. W. Schmidt. München: E. Wolff.

ORGANIC CHEMISTRY.

Organic Chemistry—the Fatty Compounds. R. L. Whitley. London: Longmans, Green & Co.

Lehrbuch der organischen Chemie. E. Erlenmeyer. Begonnen von R. Meyer, fortgesetzt von H. Goldschmidt, weiter fortgeführt von K. von Buchka. Zweiter Theil. *Die Aromatischen Verbindungen.* Erster Band. 8 Lief. (Schluss). Leipzig: C. F. Winter. 1882–1894.

The Rise and Development of Organic Chemistry. Carl Schorlemmer. Revised edition. Edited by A. Smithells. Small 8vo, pp. 280. London and New Yerk: Macmillan & Co.

Organic Chemistry. F. S. Kippling and W. H. Perkin. Part I. Phila.: J. B. Lippincott Co.

A Text-Book of Organic Chemistry. A. Bernthsen. Translated by G. M'Gowan. 2d Eng. Ed. Revised and Extended by the Author and Translator. London: Blackie.

Organische Chemie für Aerzte in 12 Vorlesungen. F. B. Ahrens. Stuttgart: F. Enke.

Organic Chemistry. W. H. Perkin and F. S. Kippling. 8. London: W. and R. Chambers. Prepared especially for students in medicine and pharmacy.

Descriptive Catalogue of Essential Oils and Organic Chemical Preparations. F. B. Power. New York: Fritzsche Brothers.

Repetitorium der organischen Chemie. A. Pinner. 10. Aufl. Berlin, S. W.: Robert Oppenheim (G. Schmidt).

Handbuch der organischen Chemie. F. Beilstein. 3. Aufl. 38. Lief. Lex. 8. Hamburg: Leopold Voss.

Die Praxis des organ. Chemikers. L. Gattermann. Leipzig: Veit u. Co.

Die Fabrikation der Aether und Grundessenzen. Die Aether, Fruchtäther, Fruchtessenzen, Fruchtextracte, Fruchtsyrupe, Tincturen zum Färben und Klärungsmittel. Nebst einem Antrage: Ueber die Zusammensetzung von Liqueuren, Branntweinen, Rum, Arrac, Cognac und verschiedenen Weinen. Ein Handbuch für Fabrikanten, etc.

Theodor Horatius. Zweite vollständig neu bearbeitete und erweiterte von August Gaber. Mit 14 Abbildungen. Wien, Pest, Leipzig: A. Hartleben's Verlag.

Essai de chemic Synthétique. F. C. Bartlet. Paris: Chamuel & Co. An essay on synthetical chemistry. The author confirms the views of Newlands, Mendeleeff and Crookes regarding the periodicity of the elements.

Grundriss der organischen Chemie. Carl Oppenheimer. Berlin: Boas u. Hesse.

La chimica delle Combinazioni del Carbonis, ovvero chimica organica. Richter. 2 a. Ediz. tradotta dal G. Carnelutti. Part I. Torino.

Organic Chemistry, Theoretical and Practical. I. S. Scarf. Adapted to the Requirements of the Science and Art Department of the London University. (Elementary Science Series.) London: W. Collins, Sons & Co.

STEREO CHEMISTRY.

Handbuch der Stereochemie. C. A. Bischoff, unter Mitwirkung von P. Walden. 2 Band (Schluss). Frankfurt a M.: M. H. Bechhold.

Handbuch der Stereochemie. C. A. Bischoff. Frankfurt a. M.: M. H. Bechhold.

CHEMICAL TECHNOLOGY.

Handbuch der Chemischen Technologie. Unter mitwirkung von Th. Beckert, Bender, Benedict, etc. Herausgegeben von O. Dammer. 1 Bd. Stuttgart: F. Enke.

Die Elektricität im Dienste der Chemischen Industrie. Häussermann. Stuttgart: K. Wittwer.

Encyclopädie der Elektrochemie. 1 Bd. Halle a S: W. Knapp.

Kurzes Lehrbuch der Chemischen Technologie. L. Medicus. 2. Lfg. Tübingen: H. Lauff. For use in high schools, and in preparatory studies of the chemist.

Jahres-Rundschau über die Chemische Industrie und deren wirtschaftliche Verhältnisse für das Jahr 1893. Unter Mitwirkung von Fachmännern herausgegeben von Adolph Bender.

It is a report on the progress of larger and smaller industries regarding analytical methods. It is published in four parts and contains 156 illustrations distributed into the text.

Part 1. Metallurgy, inorganic acids, bases and salts.

Part 2. Foods and allied products.

Part 3. Dyestuffs, Dyeing, Calico printing, Tanning, Manufacture of Paper.

Part 4. Illuminants, Explosives, Photography, Varnishes.

Technish-Chemisches Jahrbuch, 1893–1894. R. Biedermann. An account of the progress in Chemical-Technology from April, 1893, to April, 1894. Berlin: C. Heymann.

Erdmann-Konigs' Grundriss der allgemeinen Waarenkunde unter Berücksichtigung der Technologie. 12 Aufl. Von Ed. Hanausek. Leipzig: J. H. Barth (A. Weiner).

Handbuch der organischen-technischen Chemie. S. P. Sadtler (Philadelphia), Deutsch von J. Ephraim. I. Abtheilung. Leipzig: J. A. Barth.

F. Beilstein. Handbuch der organischen Chemie. 3 Aufl. 32 Lief. Hamburg: L. Voss.

FOODS.

Jahresbericht über die Fortschritte in der Untersuchung der Nahrungs und Genussmittel. 1, 2 u. 3 Jahrgang. H. Beckurts. Göttingen: Vanderhoeck u. Ruprecht.

Die Praxis des Chemikers bei Untersuchung von Nahrungs- und Genussmitteln, Gebrauchsgegenständen und Handels-producten bei hygienischen und bakteriologischen Untersuchungen, sowie in der Gerichtlichen und Harn-Analyse. 6 Aufl. Hamburg: Leopold Voss.

Die neuere Entwicklung der Nahrungsmittel Chemie. H. Trillich. Frankfurt a. M.: Jaeger. The new developments in the chemistry of foods.

Bibliothek für Nahrungsmittel Chemiker. Unter Förderung von Prof. Geissler, E. Hanausek, Prof. Medicus, K. Thiel und unter Mitwirkung von Dr. Mayrhofer, Carl Müller, H. Röttger, E. Wernicke, A. Würzburg, herausgegeben von Julius Ephraim. Leipzig: J. A. Barth.

From the contributors it will be seen that this volume is intended to be complete and practical for the critical examination of foods and nourishing materials, and for determining, preparing and investigating all matters that come before the food analyst. It will precede the following six works:

Die Nahrungsmittel-Gesetzgebung im deutschen Reiche und in den einzelnen Bundesstaaten. Arthur Wurzburg. 372 pp.

Kurzes Lehrbuch der Nahrungsmittel-Chemie. H. Röttger. 467 pp.

Sammlung der wichtigsten Originalarbeiten über Analyse der Nahrungsmittel. J. Ephraim.

Mikroskopie der Nahrungs und Genussmittel. Carl Müller.

Instrumente und Apparate zur Nahrungsmittel-Untersuchung. Dr. Mayrhofer.

Alimentos y Bebidas, Investigaciones de sus alteraciones y falsifications. C. Chicote. Madrid: R. Fé.

PERFUMERY.

Rhodologia: A Discourse on Roses and the Odour of Rose. J. C. Sawer. Brighton: W. J. Smith. The author of "Odorographia" has again shown his ardour in the study of odoriferous plants. "Rhodologia" takes a closer circumscribed area than its predecessor, but the careful collection of information from many sources is no less evident than in the larger work. While starting with a full appreciation of the beauties of the many varieties of the rose, it does not neglect to pass on to the more solid treatment of its cultivation and distillation. In the account of these the methods of various countries are described, and the reader gains a good idea of the French, Bulgarian, and German treatment of the flower. To this is added a description of perfumes resembling that (or those) of the rose.

Die Fabrikation der Parfümeriewaaren. M. Hauer. Weimer: B. F. Voigt.

PHARMACY.

Apotheker Kalender für das Deutsche Reich, begründet von Oscar Schlickum. Fr. Kober. 1895. 13 Jahrgang. Stuttgart: E. Nägele. This is intended as a practical help to the pharmacist, containing tables, indicators, newer remedies, etc.

Repetitorium der Drogenkunde. M. Levy. Freiburg, i. B.: Lorenz u. Waetzel. A reference work for pharmacists and druggists.

Pharmaceutischer Almanach. Hans Heger. 1895. 20 Jahrgang. Wien: Moritz Perles. Intended for the pharmacists of Austro-Hungary, but containing much valuable information for all pharmacists.

Einführung in die Maassanalyse. M. Vogtherr. Für junge Pharmaceuten zum Unterricht und zum Selbststudium. Unter Berücksichtigung des Arzneibuches für das deutsche Reich und der Ergänzung desselben durch die ständige Commission für die Bearbeitung dieses Arzneibuches. 2. Aufl. Newied: Heuser's Verlag.

Pharmaceutisk Haandboog for 1895. E. P. F. Peterson. Kjobenhaven: F. Host & Sons.

The Extra Pharmacopœia. By William Martindale. Eighth Edition. Pp. 584. London: H. K. Lewis.

In the anticipation of the production of a new British Pharmacopœia, Mr. Martindale has for some time been engaged in investigating the claims of many new drugs and preparations for official recognition. The work, therefore, includes notes on the proposed revision, and through the analysis of 25,500 prescriptions by the author, lists have been

compiled of unofficial preparations which seem to require admission, and of official preparations which, not being in demand, might be deleted.

It consists of a concise treatment of most unofficial drugs and preparations; at the same time it includes some official substances. The author remarks in the preface: "A tangent of an important character has been projected in the direction of preparations from the animal kingdom, which till recently had been almost entirely neglected as curative agents. We have, therefore, inserted a special chapter on Antitoxins, Serums and Lymphs, and on Animal Glands and Tissues, and their preparations.

Some further investigations have been included, notably the observations on "A. C. E." (Alcohol, Chloroform, Ether) mixture. The latest researches on the alkaloids of Aconite and Ipecacuanha, including Aconitine, Emetine and Cephaëline, which will have an important bearing on therapeutics, have been added.

Commentar zum Deutschen Arzneibuch. B. Hirsch und A. Schneider. 2te. vermehrte Ausgabe. Commentar über den Nachtrag zum Deutschen Arzneibuch. Göttingen. Vandenhoeck u. Ruprecht.

Anleitung zur Erkennung und Prüfung aller im Arzneibuch für das Deutsche Reich (3. Ausgabe) aufgenommenen Arzneimittel. M. Biechele. Anhang zur 8. Aufl. enthaltend die durch den Nachtrag zum Arzneibuch enstandenen Veränderungen und Ergänzungen. Berlin: J. Springer.

Der Drogist. J. Cracan. Theoretisches und praktisches Handbuch. Lehrbuch für angehende Drogisten zur Vorbereitung auf das Drogisten Examen. Ausg. A., 2. Band. 4. Buch. Warrenkunde. Zittan: Pahlsche' Buchhandlung.

Waarenkunde für den praktischen Drogisten, zugleich Vorschriftenbuch für Drogengeschäfte. 2 (Schluss.) Band. Zittan: Pahl'sche Buchhandlung.

Die reichsgesetzlichen Bestimmungen über den Verkehr mit Arzneimitteln (kaiserl. Verordnung vom 27 Jan., 1890) und den Handel mit Giften. H. Böttger. Unter Benutzung der Entscheidungen der deutschen Gerichtshöfe erlautert. 3 Aufl. Berlin: J. Springer.

Notes de Pharmacie fratique.—G. Dethan. Paris: Soc. d'Editions scientifigues.

The Practice of Pharmacy. Third revised edition. Illustrated. By Joseph P. Remington, Philadelphia: J. B. Lippincott Company, 1894.

The Era Formulary. First edition. Price, $5. D. O. Haynes and Co., Detroit.

This volume, which runs to over 450 pages, and contains 5,000 formulas for chemists and druggists, is divided into nine heads, as follows: Unofficial pharmaceutical preparations (800 formulas), proprietary preparations (416), toilet preparations (1,012), veterinary remedies (455), family medicines (771), household formulas (494), technical formulas (388), paints, varnishes, etc. (201), miscellaneous (455). It will thus be seen that the contents cover a wide area, and many alternative formulas are given for the various preparations. A note in the preface states that the department devoted to proprietary preparations is in response to demand for the same, but that the publishers do not assume any responsibility for the correctness of these formulas or for their employment, and it will be seen that recipes for the same preparations often vary largely, and the best of them can only be approximate to the real constitution of the preparations they are supposed to simulate.

Handwörterbuch der Pharmacie. Herausgegeben von A. Brestowski. 19 Lfg. Leipzig: W. Baumüller. This work is a collaboration by numerous writers, edited by Brestowski and intended for pharmacists, physicians and those interested in medicinal products.

Kommentar zum Nachtrag zum Arzneibuche für dar Deutsche Reich. Hager, Fischer u. Hartwich. 3 Ausgabe. Berlin: J. Springer.

Jahresbericht der Pharmacie für 1893 u. 1894. Heinrich Beckurts. Göttingen: Vandenhoeck u. Ruprecht.

The Law of the Apothecary, a compendium of both the common and statutory laws governing druggists and chemists in Massachusetts, Maine, New Hampshire, Vermont, Rhode Island and Connecticut, by George Howard Fall.

It consists of five sections or chapters. First, Civil Liability; second, Criminal Liability; third, Pharmacy Boards; fourth, Liquor Laws; fifth, Pharmacy Laws of those States.

Neues pharmaceutisches Manual. Unter Beihilfe von E. Bosetti, herausgegeben von Eugen Dieterich. 6 vermehrte Aufl, Ein Band, 740 S. Berlin: J. Springer.

Kurzes Repetitorium der Pharmacopœia practica. Wien: M. Breitenstein.

Tecnica farmaceutica secondo la farmacopea officinale ed il codice d'igiène. S. Plevani. Mailand: F. Vallardi.

A New Book on Pharmacy. Hand-Book of Theory and Practice of Pharmacy, etc., etc., by Virgil Coblentz. With 395 illustrations. Philada.: B. Blakeston, Son & Co.

This hand-book is divided into four parts, besides an introduction treating on Pharmacopœias and the nomenclature of the U. S. P., and an appendix, which consists of following tables: Table of Atomic Weights; Solubilities; Thermometric Equivalents; Equivalents of Weights and Measures, and List of Pharmacopœial Chemicals and Reagents.

Commentar des Nachtrags zum Arzneibuch für das Deutsche Reich. E. Holdermann. Mit Zugrundelegung des amtl. Textes. Im Auschlass an den v. Vulpius und Holdermann herausgegeben Schlickumschen Commentar bearbeitet. Leipzig: E. Günther.

Die neueren Arzneimittel in ihrer Anwendung und Wirkung. W. F. Loebisch. 4 Aufl. Wien: Urban u. Schwarzenberg.

Verzeichniss der Arzneimittel nach dem Arzneibuch für das Deutsche Reich. 3 Ausg. Neudruck, 1895. Zum gebrauch bei den Apotheken-Visitationen. Berlin: A. Hirschfield.

Commentar zum Arzneibuch f. das Deutsche Reich, einschliessl. des Nachtrages von 20 Dec., 1894. G. Vulpius und E. Holdermann. Mit Zugrundelegung des amtl. Textes, sowie e. Anleitg. zur Massanalyse. Im Anschluss and den Schlickumschen Commentar bearbeitet. Leipzig: E. Günther.

Ueber die Aufgaben und Grenzen der wissenschaftlichen Pharmacie. Hermann Thoms. Berlin: R. Gaertner.

Lehrbuch der Arzneimittellehre und Arzneiverordnungslehre. H. Tappeiner. Unter besond. Berückichtigung der deutschen und österreich. Pharmacopöe. 2 Aufl. Leipzig: F. C. W. Vogel.

PHOTOGRAPHY.

Cyclopaedic Photography. E. L. Wilson. London: Dawbarn.

Encyclopädie der Photographie. 14. Hefl. Halle a. S.: W. Knapp.

Anmiaire général et international de la Photographie. Avec. nombr. illustr. Paris: E. Plow, Nourrit et Cie.

Aide-mémoire de Photographie pour 1895. C. Fabre. Paris: Gaulthier-Villars et Fels.

Grundzüge der Photographie. A. Miethe. Ein Heft, 83 S. mit Textabbildungen. Halle a. S.: W. Knapp.

Die Microphotographie und die Projection. R. Neuhaus. Ein Heft, 58 S. mit 5 Abbildungen. Halle a. S.: W. Knapp.

Kalender für Photographie und verwandte Fächer pro 1895. C. F. Hoffmann. Wien: Moritz Perles.

Beiträge zur Kenntniss der photochemischen Wirkung in Lösungen. M. Roloff. Inaug. Dissert., Univ. Gottingen.

Hints on Snow Photography. By Mrs. Main. With illustrations. Sampson Low.

Beginner's Guide to Photography. Showing how to buy a camera and how to use it. 5th Ed., revised and enlarged. London: Perken, Son & Rayment.

Photographische Chemie. R. E. Liesegang, Düsseldorf: Ed. Liesegang. A book for beginners.

Die Reproductions Photographie. J. Husnik. 2 Aufl. Wien: A. Hartleben.

La chimica fotografica. R. Namias. Fasc. I. Modena: A. Namias.

Photo-Micrography. H. van Heurick. Eng. Ed. Re-edited and augmented by the author from the 4th French edition and translated by Wynne E. Baxter. With Illus. London: Crosby, Lockwood & Son.

Deutcher Photographen Kalender. K. Schwier. Taschenbuch und Almanach für 1895. 14. Jahr. Weimar.

PHYSICS.

Lehrbuch der Physik. J. R. Boyman. Für Gymnasien, Realschulen, und andere höhere Lehranstalten. 6. Aufl. Düsseldorff: L. Schwann.

Compendium der Physik. L. Graetz. Für Studirende. 2. Aufl. Wien: F. Deuticke.

Physik für Lehrerbildungsanstalten. A. Genan. Gotha: E. F. Thienemann.

Mechanics. An elementary text-book, theoretical and practical. London: Whittaker.

A Text-Book of Heat. R. Wallace Stewart. New York: W. B. Clive.

A Text-Book of Light. R. Wallace Stewart. New York: W. B. Clive.

A Text-Book of Magnetism and Electricity. R. Wallace Stewart. 2. Ed. New York: W. B. Clive.

Manual of Physico-Chemical Measurements. W. Ostwald. Translated by James Walker. London and New York: Macmillan.

A Laboratory Manual of Physics and Applied Electricity. E. L. Nichols. 2 vols. London and New York: Macmillan.

Anfangsgründe der Physik mit Einschluss der Chemie und Mathematischen Geographie. K. Koppe. 20. Aufl. Ausgabe B in 2 Lehrgängen. Für höhere Lehranstalten nach den preuss. Lehrplänen von 1892. Bearbeitet von A. Husmann. II. Th.: Hauptlehrgang. Essen: G. D. Baedeker.

Elementi di Fisica ad Uso delle Scuole secondarie. F. Cintolesi. Livorno.

Elementary Lessons in Electricity and Magnetism. By Silvanus P. Thompson. London: Macmillan & Co.

Colour Vision: Being the Tyndall Lectures delivered in 1894 at the Royal Institution by W. de W. Abney. Colored plate and diagrams. Sampson Low.

Elemente der theoretischen Physik. C. Christiansen. Deutsch von J. Müller. Mit einem Vorwort v. E. Wiedemann. Leipzig: J. A. Barth.

Thermo Dynamics treated with Elementary Mathematics. J. Parlseo. London: S. Low & Co.

Lehrbuch der Experimentalphysik. A. Wüllner. I. Band. 5. Aufl. (x, 1,000 S. m., 321 Albbild.) Leipzig: B. G. Teubner. This volume treats of general physics and acoustics.

Lehrbuch der Physik für Gymnasien, Realgymnasien, Oberrealschulen und andere höhere Bildungs-Anstalten. J. Heussi. 6te. Aufl. neubearbeitet von A. Leiber. Braunschweig: O. Salle.

Light: A Course of Experimental Optics Chiefly with the Lantern. L. Wright. New cheaper edition. Revised and enlarged. New York: Macmillan & Co.

Practical Work in General Physics, for use in Schools and Colleges. W. G. Woollcombe. Oxford: The Clarendon Press. This work contains directions for about 50 experiments in general physics.

Theoretische Physik. W. Voigt. Erster Band. Mechanik starrer und nichtstarrer Körper; Wärmelehre. Leipzig: Veit u. Co.

Theorie der Gase. O. E. Meyer. 1. Abth. 2. Aufl. Breslau: Maruschke u. Berendt.

Fortschritte der Physik im Jahre 1888. Dargestellt von der physikal. Gesellschaft zu Berlin. 44. Jahrg. 2. Abth. Braunschweig: F. Vieweg u. Sohn.

Preparatory Physics.—H. J. Hopkins. London and New York: Longmans, Green & Co. A short course in the laboratory.

List of the Chief Memoirs on the Physics of Matter. R. A. Lehfeldt. Published under the direction of the Physical Society of London.

An Introduction to the Study of Electricity. L. Cummings. With numerous examples. 4th Ed. with corrections and additions. New York: Macmillan.

The Student's Text-Book of Electricity. H. H. Noad. With an introduction and additional chapters by W. H. Preece. London: Crosby, Lockwood & Son.

Ueber die Beziehung hochgradiger Quecksilberthermometer aus Jenaer Glas 59^{III} auf das Luftthermometer zwischen 300 u. 509°. A. Mahlke. Inaug.-Dissert. Göttingen: Vandenhöck u. Ruprecht.

Physikalische Aufgaben für die oberen Classen höherer Lebranstalten. Aus den bei Entlassungsprüfungen gestellten Aufgaben ausgewählt und mit Hinzufügung der Lösungen zu einem Uebungsbuche vereinigt. W. Budde. 2 Aufl. Braunschweig: Fr. Vieweg u. Sohn.

Heat. L. Carrumag. New York: Longsmann, Green & Co. Treatment of the subject experimentally for the use of schools and students.

Text-Book of Magnetism and Electrictty. R. W. Stewart. 2d Ed. (Tutoral Physics, Vol. IV.) London: Clive.

Lehrbuch der Physik. H. Götz. 2 Aufl. Mit 292 Figuren und zahlreichen Uebungsaufgaben. München: G. Franzscher Verlag.

Symbols for Physical Quantities and Abbreviations for Units. Recommended by the Committee on Notation of the Chamber of Delegates of the International Electric Congress, 1893. Corrected by E. Hospitalier. Re-printed from the Electrical World.

Physikalische Krystallographie und Einleitung in die krystallographische Kenntntss der wichtigeren Substanzen. P. Groth. 3 Aufl. Leipzig: Wm. Engelmann.

Manuel de Physique médicale. J. Lefévre. Paris: Asselin et Houzean.

Lehrbuch der Experimentalphysik. E. v. Lommel. 2 Aufl. Leipzig: J. A. Barth.

Industrial Photometry. A. Palaz. From the French by G. W. Patterson, Jr., and M. R. Patterson. New York: D. van Nostrand Co. With special application to electric lighting.

Handbuch der Physik. A. Winkelmann. 3 Bd. 2 Abth. Breslau: Ed. Trewendt.

Leitfaden der Physik mit Einschluss der einfachsten Lehren der mathematischen Geographie nach der Lehr—und Prüfungsordnung von 1893 für Gymnasien. 1 Bd. 2 Aufl. Leipzig: S. Hirzel.

THERAPEUTICS, HYGIENE, TOXICOLOGY, ETC.

Therapeutisk recepthandbog fo grundvalen af den nor diska landernas farmakopëer. S. Ribbling. 12°. Lund: C. W. K. Gleerup.

Secret Nostrums and Systems of Medicine. A book of formulas. Compiled by Charles W. Oleson. Fifth edition, revised and enlarged. Chicago: Oleson & Co.

It contains descriptions of the composition of some 353 patent medicines and gives detailed explanations of a number of widely-advertised and baneful systems of quackery.

The Indian Manual of Hygiene. A. E. Grant. London: H. K. Lewis.

Lehrbuch der Hygiene. M. Rubner. 5 Aufl. Wien: F. Deutick.

A systematic presentation of the subject with the consideration of the more important methods of investigation.

Bibliothek für Nahrungsmittel—Chemiker. Herausgegeben von J. Ephraim. 3 Bd. Von J. Mayrhofer. Leipzig: J. A. Barth.

This volume contains the account of apparatus and instruments in use in the examination of food products.

A Text-Book of Physiological Chemistry. By Olaf Hammarsten. Authorized translation from the second Swedish edition and from the author's enlarged and revised German edition by John A. Mandel. First edition. New York. John Wiley & Sons.

Traité de Chimie légale. Barillot. Analyse toxicologique. Recherches spéciales. Avec nombr. fig. 8°.

Handbuch der praktischen Gewerbehygiene (Industrial Hygiene). Unter Mitwirkung von E. Claussan, G. Evert, K. Hartmann, W. Opperman, Th. Oppler, R. Platz, C. Specht, A. Villaret, herausgegeben von H. Albrecht. 2 Lief. Berlin: R. Oppenheim.

Die Oele (Oleosa) als Arznei- und Volksheilmittel. Therapeutisch-pharmaceut. Mittheilungen. A. A. Michaelis. Leipzig-Reudnitz: R. Michaelis.

Materia Medica, Pharmacy, Pharmacology and Therapeutics. By W. Hale White, M. D., F. R. C. P. Edited by Reynold W. Wilcox, M. A., M. D., LL. D. Second American edition, thoroughly revised. Pp. 661. P. Blakiston, Son & Company, Philadelphia.

Grundzüge der Hygiene. W. Prausnitz 2. Aufl. Leipzig: Oscar Leiner.

Ernährungs- u. Nahrungsmittelehre zum Praktischen Gebrauche für Hausfrauen, Familien und Haushaltungsvorstände. Th. Huperz.

Air, Water, and Disinfectants. By C. M. Aikman. 1s. Society for Promoting Christian Knowledge.

Lehrbuch der Pharmakologie für Thieraerzte. G. Müller. Dresden: G. Schönfeld. This work is based upon the German and Austrian pharmacopœias, and considers the drugs from the pharmacognostical, pharmaceutical-chemical and toxicological standpoints.

Histopathologie der Hautkrankheiten. P. G. Unna.

Formulaire des eaux minérales de la balnéothérapie et de l'hydrothérapie. E. de la Harpe. Paris: J. B. Balliere et fils.

Text-Book of Hygiene. G. H. Rohe. Philadelphia: F. A. Davis Co. A comprehensive treatise on the principles and practice of preventive medicine from an American standpoint.

Laboratory Manual of Elementary Physiology and Urine Analysis. John H. Long. Chicago: E. H. Colegrove & Co. Pp. 366.

Physiological Action of Nitrites of the Paraffin Series. J. Theodore Cash and W. R. Dunstan. London: Kegan, Paul, Trench, Trübner & Co. Pp. 135.

The authors endeavor to throw further light on the mode of action of the paraffin nitrites when introduced into the animal organism, and observations were made regarding the action of the following eleven nitrites in a pure state on blood pressure, pulse, respiration, and stirated muscular fibre:

Methyl nitrite, ethyl nitrite, primary propyl nitrite, secondary propyl nitrite, primary butyl nitrite, secondary butyl nitrite, iso primary butyl nitrite, alpha-iso-primary amyl nitrite, beta-iso-primary amyl nitrite and tertiary amyl nitrite.

Certain of these nitrites were prepared for the first time, and some of those previously described were found to possess different physical properties to those usually ascribed to them. The selection made rendered it possible to compose the action of a series of substances containing an atom of nitronyl, NO_2, united respectively with CH_3, C_2H_5, C_3H_7, C_4H_9, and C_5H_{11}, and to determine the modifying influence exerted by these radicals upon the characteristic action of nitronyl. An abstract appears in Pharm. Jour. Trans., 1894, 313. When the effects of primary, secondary and tertiary nitrites, alike in composition, were compared, it was found that the secondary compound had a more powerful influence generally than the primary and the tertiary than the secondary. The more marked effect of the nitrites and the largest molecules, but containing least nitronyl is supposed to be due to their decreased chemical stability; and the greater power of secondary as compared with primary and of tertiary as compared with secondary nitrites,

is attributed to their respectively greater instability rather than to the number of methyl groups attached to the carbon combination of the nitronyl group.

A Manual of Therapeutics. By A. A. Stevens. Prepared especially for students as an outline of modern therapeutics to be filled in by larger works, together with an article on *Incompatibility in Prescriptions* by Joseph W. England. Cloth, 12mo, pp. 435. Philadelphia: W. B. Saunders.

MISCELLANEOUS.

Die Riechstoffe und ihre Verwendung zur Herstellung von Duftessenzen, Haarölen, Pomaden, Riechkissen, etc., sowie anderer kosmetischer Mittel. S. Mierzinski. 7, (Titel-) Aufl. Weimar: B. F. Voigt.

APPENDIX.

LIST OF COLLEGES AND ASSOCIATIONS

HAVING ACCREDITED DELEGATES TO THE FORTY-THIRD ANNUAL MEETING, HELD AT DENVER, COLO., WITH THE NAMES OF THEIR PRESIDENTS AND SECRETARIES.

COLLEGES OF PHARMACY.

Name.	*President.*	*Secretary.*
Chicago	W. M. Sempill	W. F. Dunham.
Cincinnati	George Eger	A. W. Bain.
Louisville	Addison L. Dimmitt	G. L. Curry.
Maryland	Louis Dohme	E. B. Fischer.
Massachusetts	John G. Benedict	W. D. Wheeler.
Montreal	David Watson	E. Muir.
National	F. M. Criswell	W. H. Bradbury.
New York	Sam'l W. Fairchild	J. Niven Hegeman.
Philadelphia	Charles Bullock	Wm. B. Thompson.
Pittsburg		
St. Louis	Edm. P. Walsh	J. C. Falk.

SCHOOLS OF PHARMACY.

Iowa University	Chas. A. Schaeffer, *President.*
Northwestern University	Oscar Oldberg, *Dean.*
University of Michigan	A. B. Stevens, *Secretary.*

STATE PHARMACEUTICAL ASSOCIATIONS.

	President.	*Secretary.*
Alabama	W. F. Dent, Montgomery	P. C. Candidus, Mobile.
Colorado	F. H. Arcularius, Colorado Springs.	John Kochan, Denver.
Connecticut	Chas. A. Rapelye, Hartford	Fred'k Wilcox, Waterbury.
Florida	W. I. Woodman, St. Augustine	M. W. Stewart.
Georgia	D. W. Curry, Rome	H. H. Arrington, Summerville.
Illinois	F. Lueder, Peoria	Frank Fleury, Springfield.
Indiana	T. J. Moffat, Edinburg	A. Timberlake, Indianapolis.
Kansas	H. H. Hettinger, Wichita	Mrs. M. O. Miner, Hiawatha.
Kentucky	Addison L. Dimmitt, Louisville	J. W. Gayle, Frankfort.
Louisiana	Nemours P. Roux, New Orleans	Mrs. E. Rudolf, New Orleans.
Massachusetts	Francis M. Harris	James F. Guerin.
Michigan	Geo. J. Ward, St. Clair	Benj. Schrouder, Grand Rapids.
Minnesota	Wm. Gausewitz, Owatonna	Chas. T. Heller, St. Paul.

Missouri	J. M. Love, Kansas City	H. M. Whelpley, St. Louis.
Nebraska	Henry R. Gering, Plattsmouth	W. L. Heilman, Tecumseh.
New Jersey	Chas. F. Dare, Bridgeton	Wm. C. Alpers, Bayonne.
New York	Geo. J. Seabury, New York	Clay W. Holmes, Elmira.
North Carolina	Parry W. Vaughan, Durham	H. R. Horne, Fayetteville.
New Mexico	Lawrence E. Nowers, Hillsboro	B. Krippe.
North Dakota	Ole Granrud, Grand Forks	W. S. Parker, Lisbon.
Ohio	Chas. W. Tobey, Troy	Lewis C. Hopp, Cleveland.
Pennsylvania	H. N. Coxe, Schuylkill Haven	J. A. Miller, Harrisburg.
Rhode Island	Mason B. Wood, East Providence	Wm. E. Cates, Providence.
South Dakota	James Lewis, Canton	I. A. Keith, Lake Preston.
Tennessee	A. B. Rains, Columbia	Will Vickers, Murfreesboro.
Texas	H. L. Carleton	R. H. Walker.
Virginia	Wm. G. Burgess, Hampton	C. B. Fleet, Lynchburg.
Wisconsin	A. H. Hollister, Madison	E. B. Heimstreet, Janesville.
Province of Quebec	R. W. Williams, Three Rivers	E. Muir, Montreal.

ALUMNI ASSOCIATIONS OF COLLEGES OF PHARMACY.

	President.	*Secretary.*
Chicago	James A. Lydston	Wm. P. Knoche.
Maryland	John F. Hancock	Clinton G. Blades.
Northwestern Univ.	Chas. W. Patterson	
Philadelphia	Jacob S. Beetem	Wm. E. Krewson.
St. Louis	Wm. C. Bolm	Lorenz A. Seitz.

COUNTY AND CITY ASSOCIATIONS.

	President.	*Secretary.*
Chicago Retail Druggists.	Thos. V. Wooten	Louis Lehman.
Kings Co. (N. Y.)	F. H. Pamphilon	Flavel N. Bliss.
N. Y. Ger. Apothecaries	Gust. Ramsperger	Geo. Leinecker.

NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

Thomas F. Main, *President*.....A. B. Merriam, *Secretary*.

AMERICAN MEDICAL ASSOCIATION.

Beverly W. Cole, M. D., *President* ....Wm. B. Atkinson, M. D., *Permanent Secretary*.

LIST OF MEMBERS IN ATTENDANCE AT DENVER.

Names of delegates indicated by *.

*Alexander, M. W., St. Louis, Mo.
*Allison, William O., New York, N. Y.
*Alpers, William C., Bayonne, N. J.
Andrew, Edgar C., Montgomery, Ala.
*Baker, T. Roberts, Richmond, Va.
Bartley, Elias H., Brooklyn, N. Y.
Beal, J. H., Scio, O.
Becker, Charles L., Ottawa, Kans.
Beitenmann, Wm., Denver, Colo.
Best, John, Central City, Colo.
*Bishop, Samuel E., Chicago, Ill.
*Boerner, Emil L., Iowa City, Ia.
*Brandenberger, Adolph, Jefferson City, Mo.
Breunert, H. O., Kansas City, Mo.
*Brown, Robert J., Leavenworth, Kans.
*Burgheim, Jacob, Houston, Tex.
Byrne, John, Columbus, O.
*Cameron, Donald L., Brooklyn, N. Y.
*Carter, Frank H., Indianapolis, Ind.
*Caspari, Chas., Jr., Baltimore, Md.
*Chalin, Louis N., New Orleans, La.
*Cook, Thos. P., New York, N. Y.
*Corcoran, Chas. E., Kansas City, Mo.
Cornell, Edward A., Williamsport, Pa.
Crona, E. S., Lyons, Colo.
Davison, James, Jamestown, N. Dak.
Depeyre, Louis N., Littleton, Colo.
*Diehl, C. Lewis, Louisville, Ky.
*Dimmitt, Addison L., Louisville, Ky.
Doerschuk, Albert M., Kansas City, Mo.
Dohme, Alfred R. L., Baltimore, Md.
*Ebert, Albert E., Chicago, Ill.
Eichrodt, Chas. W., Indianapolis, Ind.
*Eliel, Leo, South Bend, Ind.
Faber, Fred'k W., St. Paul, Minn.
*Fennel, Chas. T. P., Cincinnati, O.
Fieber, G. A., Cincinnati, O.
*Ford, Chas. M., Denver, Colo.
*Frost, William H., St. Paul, Minn.
*Gering, Henry R , Plattsmouth, Neb.
*Good, James M., St. Louis, Mo.
Gordon, Wm. J. M., Cincinnati, O.
*Graner, William, New Orleans, La.
Greve, T. L. A., Cincinnati, O.
*Griffen, Truman, Minneapolis, Minn.
Hallberg, C. S. N., Chicago, Ill.
Hamilton, Claude C., Kansas City, Mo.
*Harding, L. H., St. Paul, Minn.
Hattenhauer, R. C., La Salle, Ill.
*Hechler, Geo. L., Cleveland, O.
Helfman, Joseph, Detroit, Mich.
Hill, Frederick J., Salt Lake City, Utah.
*Holmes, Clay W., Elmira, N. Y.
*Hover, Wm. A., Denver, Colo.
Howard, Fletcher, Sheldon, Ia.
Howson, A. B., Chillicothe, O.
Huecker, Jno., Denver, Colo.
*Hurty, John N., Indianapolis, Ind.
Jacobs, Joseph, Atlanta, Ga.
Kauffman, Geo. B., Columbus, O.
Kellam, C. R. J., Heron Lake, Minn.
*Kennedy, Geo. W., Pottsville, Pa.
Klein, E. F., Hot Springs, Ark.
Kline, Chas. S., Denver, Colo.
Klotz, August E., Chicago, Ill.
*Kochan, John, Denver, Colo.
*Kuhn, Norman A., Omaha, Neb.
*La Pierre, Elie H., Cambridgeport, Mass.
Lawbaugh, E. S., St. Mary, Mo.
*Legendre, J. A., New Orleans, La.
*Lehman, Louis, Chicago, Ill.
*Leis, Geo. W., Lawrence, Kans.
Lord, Frank J., Denver, Colo.
*Lloyd, John U., Cincinnati, O.
*MacDonald, Allan D., Savannah, Ga.
*MacRae, John Y., Raleigh, N. C.
*Mayo, Caswell A., New York, N. Y.
*McCrea, H. F., Denver, Colo.
*McDonald, Geo., Kalamazoo, Mich.
McElwee, E. J., Mt. Pleasant, Pa.
McGill, John T., Nashville, Tenn.
Merrell, A. H., Topeka, Kans.
*Merrell, Chas. G., Cincinnati, O.
*Miner, Mrs. M. O., Hiawatha, Kans.

*Mittelbach, Wm., Booneville, Mo.
Morison, J. L. D., Philadelphia, Pa.
*Morrison, Joseph E., Montreal, Can.
*Muir, E., Montreal, Can.
Netz, Richard H. G., Owatonna, Minn.
*Oldberg, Oscar, Chicago, Ill.
*Parisen, Geo. W., Perth Amboy, N. J.
*Patton, John F., York, Pa.
*Peacock, J. C., Philadelphia, Pa.
*Porterfield, W. C., Silver City, N. Mex.
*Prescott, Albert B., Ann Arbor, Mich.
Quandt, Arthur A., Baltimore, Md.
*Remington, Joseph P., Philadelphia, Pa.
Robinson, Edw. A., Lowell, Mass.
Roux, Nemours P., New Orleans, La.
Royster, Oliver M., Hickory, N. C.
Ryan, Frank G., Philadelphia, Pa.
*Sadtler, Sam'l P., Philadelphia, Pa.
*Sauer, Louis W., Cincinnati, O.
*Sayre, Lucius E., Lawrence, Kans.
*Scherer, Andrew, Chicago, Ill.
*Schimpf, Henry W., Brooklyn, N. Y.
*Schoettlin, Albert J., Louisville, Ky.
*Scholtz, Edmund L., Denver, Colo.
*Schuh, Paul G., Cairo, Ill.
*Seabury, George J., New York, N. Y.
Sempill, Walter M., Chicago, Ill.
*Sheppard, S. A. D., Boston, Mass.
*Sherrard, C. C., Detroit, Mich.
Sherman, Chas. R., Omaha, Neb.
*Shultz, M. E., Beatrice, Neb.
*Simpson, Wm., Raleigh, N. C.
*Simon, William, Baltimore, Md.
Soetje, Edw. C., Denver, Colo.
Sohrbeck, G. Henry, Moline, Ill.
Solomons, I. A., Savannah, Ga.
Sprague, W. G., Flushing, Mich.
Stearns, Henry A., Detroit, Mich.
Stebbins, H. F., Denver, Colo.
Stecher, H. W., Cleveland, O.
*Stewart, Francis E., Denver, Colo.
*Stiles, Justin E., St. Louis Park, Minn.
Taylor, George E., Leadville, Colo.
Thames, Joseph J., Taylor, Tex.
*Thompson, Wm. S., Washington, D. C.
Tomlinson, B. A., Atchison, Kans.
*Torbert, W. H., Dubuque, Ia.
Voss, Geo. W., Cleveland, O.
Walker, David, Kansas City, Mo.
Wangler, C. D., Waterloo, Ia.
Ward, Chas. E., Denver, Colo.
*Watson, Sidney P., Atlanta, Ga.
Webber, J. LeRoy, Syracuse, N. Y.
Wells, C. H., Denver, Colo.
*Wetterstroem, Albert, Cincinnati, O.
*Whelpley, Henry M., St. Louis, Mo.
Wilhite, F. T., Anderson, S. C.
*Williams, Seward W., East Orange, N. J.
*Woodward, B. W., Lawrence, Kans.
*Wooten, Thomas V., Chicago, Ill.
*Zimmermann, C., Peoria, Ill.

LIST OF NEW MEMBERS.

Allison, Wm. O., New York, N. Y.
Andrew, Edgar C., Montgomery, Ala.
Ardery, Lorimer, Hutchinson, Kans.
Ault, Edward A., Marysville, Kans.
Axness, Ole M., Fergus Falls, Minn.
Bastin, Edson S., Philadelphia, Pa.
Bradbury, Wymond H., Washington, D. C.
Brecht, Frederick A., Yankton, S. Dak.
Breunert, Herman O., Kansas City, Mo.
Brunner, Chas. H., Fremont, Neb.
Cambier, Jacob, Pueblo, Colo.
Capdau, Pierre A., New Orleans, La.
Carr, Jerome C., Du Quoin, Ill.
Carton, John A., Britt, Iowa.
Chabot, David P., Jewett City, Conn.
Chapman, Wm. H., Montreal, Can.
Clark, James R., St. Joseph, Mo.
Clowes, Wm. L., Hugo, Colo.
Cole, Allen M., Virginia City, Nev.
Collins, Carrie S., Garner, Iowa.
Corcoran, Chas. E., Kansas City, Mo.
Craighead, Gordon G., Aux Vasse, Mo.
Danek, John F., Minneapolis, Minn.
Danz, Martin, Peru, Ill.
Darrah, Andrew J., Newhall, Mo.
Daus, Leopold L., Rock Springs, Wyo.
Davison, James, Jamestown, N. Dak.
Day, Wm. B., Chicago, Ill.
Décary, Louis A., Montreal, Can.
De Graffe, Bertha L., Philadelphia, Pa.
Dent, Warren F., Montgomery, Ala.
Dimmitt, Addison L., Louisville, Ky.
Doerschuk, Albert N., Kansas City, Mo.
Dorr, Edward C., Austin, Minn.
Eads, Robert I., Indianapolis, Ind.
Eckstein, Andrew J., New Ulm, Minn.
Entz, Jacob J., Hillsboro, Kans.
Eppley, James K., Washington, D. C.
Faber, Frederick W., St. Paul, Minn.
Fischer, E. Baldwin, Baltimore, Md.
Flemer, Lewis, Washington, D. C.
Flett, Frederick W., Toronto, Can.
Gane, Eustace H., New York, N. Y.
Gausewitz, Wm. J. F., Owatonna, Minn.
Gering, Henry R., Plattsmouth, Neb.
Goodrich, George H., Anoka, Minn.
Griffen, Truman, Minneapolis, Minn.
Haggarty, Mary, Eyota, Minn.
Hall, Alden T., St. Paul, Minn.
Hamlin, James A., Lawrence, Kans.
Harrah, John W., Minneapolis, Minn.
Harrison, Richard H. M., Richmond, Va.
Haussmann, Frederick W., Philadelphia, Pa.
Hawley, Wm. B., Faribault, Minn.
Heller, Charles T., St. Paul, Minn.
Herbst, William P., Washington, D. C.
Higgins, Albert W., Rutland, Vt.
Hill, Frederick J., Salt Lake City, Utah.
Hinrichs, Gustavus D., St. Louis, Mo.
Holgate, Francis H., Toronto, Can.
Hodgkinson, Samuel J., Reno, Nev.
Holverson, Henry T., Alexandria, Minn.
Hover, William A., Denver, Colo.
Howard, Fletcher, Sheldon, Iowa.
Hurlebaus, George W., Washington, D. C.
Jelliffe, Smith Ely, New York, N. Y.
Jewell, Walter H., New York, N. Y.
Jones, David F., Watertown, S. Dak.
Joyce, Robert, Newark, N. J.
Kaczoroski, Adolph O., New Orleans, La.
Kellam, Chas. R. J., Heron Lake, Minn.
Kenworthy, John, Coatesville, Pa.
Kershaw, John P., St. Joseph, La.
Klotz, August E., Chicago, Ill.
Laird, John, Diamond P. O., Ark.
Lawbaugh, Emanuel S., St. Mary, Mo.
Lehmann, Louis, Chicago, Ill.
Leine, Arthur M., Honesdale, Pa.
Levinson, Joseph, Napa, Cal.
Lowe, Clement B., Philadelphia, Pa.
MacDonald, Allan D., Savannah, Ga.
Mason, George L., Palouse, Wash.

McCrea, Harry F., Denver, Colo.
McGeorge, William, Argentine, Kans.
McGill, John T., Nashville, Tenn.
McMeel, James H., Lost Nation, Iowa.
Miller, Emerson R., Auburn, Ala.
Mork, Thomas M., Wheaton, Minn.
Morison, J. Louis D., Philadelphia, Pa.
Muir, Ebenezer, Montreal, Can.
Mulcahy, Daniel D., Washington, D. C.
Naly, Sarah L., Denver, Colo.
Netz, Richard H. G., Owatonna, Minn.
Nickey, Frank B., Muncie, Ind.
Nordmann, Herman, Baltimore, Md.
Norton, George E., Cambridgeport, Mass.
Ogier, John M., Cambridge, O.
Parker, William S., Lisbon, N. Dak.
Parisen, Allen C., South Amboy, N. J.
Partridge, Frank R., Augusta, Me.
Peterson, J. Otto, Minneapolis, Minn.
Pinniger, William, Reno, Nev.
Porterfield, William C., Silver City, N. Mex.
Powell, Wm. C., Snow Hill, Md.
Rhodes, Chas. O., Groton, N. Y.
Richardson, Thomas L., Baltimore, Md.
Rogers, Henry H., Kankakee, Ill.
Roux, Nemours P., New Orleans, La.
Schrouder, Benjamin, Grand Rapids, Mich.
Simpson, Wm. C., Vienna, Ill.
Sprague, Wesson G., Flushing, Mich.
Starz, Emil A., Helena, Mont.
Stecher, Henry W., Cleveland, O.
Steinmetz, Frank J., Carson City, Nev.
Stiles, Justin E., St. Louis Park, Minn.
Stuver, Emanuel, Rawlins, Wyo.
Tammen, George, Eureka, S. Dak.
Taylor, George E., Leadville, Colo.
Thames, Joseph J., Taylor, Tex.
Thompson, Albert D., Minneapolis, Minn.
Tomlinson, Burton A., Atchison, Kans.
Townsend, Albert D., Randolph, Neb.
Vance, James W., Rockwall, Tex.
Vellines, Davies, Baltimore, Md.
Vitt, Rudolph S., St. Louis, Mo.
Vonachen, Frank H., Peoria, Ill.
Votteler, William, Louisville, Ky.
Ward, Chas. E., Denver, Colo.
Ward, Milo W., Des Moines, Iowa.
Webster, H. Gordon, Minneapolis, Minn.
Werner, Benjamin C., Black River Falls, Wis.
Westlake, Leonard J., Gold Hill, Nev.
Whiting, J. Frederick, Great Barrington Mass.
Woods, George D., Cheyenne, Wyo.
Woodward, Brinton W., Lawrence, Kans.
Zimmermann, Bernard, St. Paul, Minn.

LIST OF LIFE MEMBERS.

PUBLISHED IN ACCORDANCE WITH RESOLUTIONS OF THE COUNCIL.

SEE PROCEEDINGS 1888, PAGE 41.

[Names of Life Members under the Old Constitution in *Italics;* under the present By-Laws, in SMALL CAPITALS.]

Abernethy, Maxwell.
Ash, Matthew F.
Baxley, J. Brown.
BAYLEY, AUGUSTUS R.
Berrian, Geo. W.
BIROTH, HENRY.
Blatchford, Eben.
BORING, EDWIN M.
Bower, Henry.
Bullock, Charles.
CANNING, HENRY.
Cummings, Henry T.
CUTLER, EDWARD WALDO.
Dearborn, George L.
Doliber, Thomas.
DRURY, LINUS D.
Du Puy, Eugene.
EBERT, ALBERT E.
Ellis, Evan T.
FOUGERA, EDMUND C. H.
FULLER, OLIVER F.
Gale, Edwin O.
Gale, William H.
Gallagher, Charles K.
Goodwin, Wm. W.
Gordon, Wm. J. M.
Grahame, Israel F.
GRIFFITH, ALBERT R.
Haviland, Henry
Hay, Henry H.
HEINITSH, CHARLES A.
Heintzelman, Joseph A.
Heyl, James B.
HOLZHAUER, CHARLES.
Hudnut, Alexander.
JACQUES, GEORGE W.
Jenks, Wm. F.
Kent, Robert R.
KING, JAMES T.
KLUSSMANN, HERMANN.
LAND, ROBERT H.
LEE, JAMES A.
Leitch, Arthur.
LEMBERGER, JOSEPH L.
LLEWELLYN, JOHN F.
McConville, Thomas A.
McPherson, George.
Mellor, Alfred.
MEYER, CHRISTIAN, F. G.
MILHAU, EDWARD L.
MILLER, ADOLPHUS W.
Moffit, Thomas S.
Moith, Augustus T.
Molwitz, Ernest.
Newman, George A.
Ollif, James H.
ORNE, JOEL S.
Paine, James D.
Parr, John C.
Patten, I. Bartlett.
Peabody, William H.
Perot, T. Morris.
PETTIT, HENRY M.
PFINGST, FERDINAND J.
Plummer, David G.
Rano, Charles O.
REMINGTON, JOSEPH P.
Rittenhouse, Henry N.
ROBINSON, JAMES S.
Rollins, John F.
ROSENGARTEN, MITCHELL G.
Russell, Eugene F.
SANDER, ENNO.
SEABURY, GEORGE J.
Sharp, Alpheus P.
SHEPPARD, SAMUEL A. D.

Snyder, Ambrose C.
Sweeney, Robert O.
Taylor, Alfred B.
Thompson, William B.
TUFTS, CHARLES A.
Turner, T. Larkin.
Vernor, James.
Wardell, Robert C.
Warner, William R.
WELLCOME, HENRY S.
WHITE, AARON S.
WHITFIELD, THOMAS.
WHITNEY, HENRY M.
Wiegand, Thomas S.
WINKELMANN, JOHN H.
WINTER, JONAS.
WOLTERSDORF, LOUIS.
YORSTON, MATTHEW M.
ZEILIN, J. HENRY.

GENERAL INCORPORATION LAW FOR THE DISTRICT OF COLUMBIA.

Sections Applicable to the American Pharmaceutical Association.

Class 3, Societies, Benevolent, Educational, etc.

Sec. 545. Any three or more persons of full age, citizens of the United States, a majority of whom shall be citizens of the District, who desire to associate themselves for benevolent, charitable, educational, literary, musical, scientific, religious, or missionary purposes, including societies formed for mutual improvement, or for the promotion of the arts, may make, sign, and acknowledge before any officer authorized to take acknowledgement of deeds in the District, and file in the office of the Recorder of Deeds, to be recorded by him, a certificate in writing, in which shall be stated:

First. The name or title by which such society shall be known in law.

Second. The term for which it is organized, not exceeding twenty years.

Third. The particular business and objects of the society.

Fourth. The number of its trustees, directors, or managers for the first year of its existence.

Sec. 546. Upon filing their certificate, the persons who shall have signed and acknowledged the same, and their associates and successors, shall be a body politic and corporate, by the name stated in such certificate; and by that name they and their successors may have and use a common seal, and may alter and change the same at pleasure, and may make by-laws and elect officers and agents; and may take, receive, hold and convey real and personal estate necessary for the purposes of the society as stated in their certificate.

Sec. 547. Such incorporated society may annually, or oftener, elect from its members its trustees, directors, or managers, at such time and place, and in such manner as may be specified in its by-laws, who shall have the control and management of the affairs and funds of the society, and a majority of whom shall be a quorum for the transaction of business; and whenever any vacancy shall happen among such trustees, directors, or managers, the vacancy shall be filled in such manner as shall be provided by the by-laws of the society.

Sec. 548. The trustees, directors, or stockholders of any existing benevolent, charitable, educational, musical, literary, scientific, religious, or missionary corporation, including societies formed for mutual improvement, may, by conforming to the requirements herein, re-incorporate themselves, or continue their existing corporate powers under this chapter, or may change their name, stating in their certificate the original name of such corporation as well as their new name assumed; and all the property and effects of such existing corporation shall vest in and belong to the corporation so re-incorporated or continued.

Sec. 549. Such corporations may sell and dispose of any real estate they may acquire by purchase, gift, or devise, as follows: whenever any lot purchased for the use of the corporation, or any building erected thereon, shall become ineligible for the uses for which the lot was purchased or the building erected, to be determined by a vote of two-thirds of the shares of the stock of the corporation or the members of the corporation, at a meeting of the stockholders, or corporators, or members specially called for that purpose, the proceedings of which meeting shall be duly entered in the records of the

corporation; said lot or building may be sold, and the proceeds thereof may be vested in another lot, or in the erection of another building, or both.

SEC. 550. When any real estate shall have been devised or given to any such corporation for any specified benevolent purpose, and where, by a vote of three-fourths of the stock held by the stockholders, or three-fourths of the corporators, if no shares of stock have been created, at a meeting called for the purpose, of which such stockholders or corporators or members shall have at least ten days' notice, the corporation shall determine to surrender their corporate powers and cease to act under the same, said real and personal estate so acquired shall be sold at public auction, proper notice of the time and place of sale having been given, and the proceeds of the sale equitably distributed among the stockholders or corporators, or disposed of for the promotion and advancement of the objects for which such corporation was originally organized.

SEC. 551. No corporation acting under the six preceding sections shall hold real estate more than five years, except so much as shall be necessary for the purposes named in its certificate.

SEC. 552. The provisions of this chapter shall not extend or apply to any association or individual who shall, in the certificate filed with the Recorder of Deeds, use or specify a name or style the same as that of any previously existing incorporated body in the District.

Approved 5 May, 1870, c. 80, v. 16, pp. 98–116—Revised Statutes of the United States, relating to the District of Columbia.

CERTIFICATE OF INCORPORATION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Whereas, we, the undersigned, desire to form an association having for its object to unite the educated and reputable Pharmacists and Druggists of America, as will more fully hereinafter appear;

Now, therefore, we do hereby certify as follows:

First, The corporate name of the association is the American Pharmaceutical Association.

Second, This association shall continue until dissolved by the action of its members, or by the operation of law.

Third, The objects and business of said association are as follows:

a. To improve and regulate the drug market, by preventing the importation of inferior, adulterated or deteriorated drugs, and by detecting and exposing home adulterations.

b. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

c. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and in encouraging home production and manufacture in the several departments of the drug business.

d. To regulate the system of apprenticeship and employment, so as to prevent, so far as possible, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

e. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

f. To uphold standards of authority in the education, theory and practice of Pharmacy.

g. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and the greatest protection to the public.

Fourth, The concerns and affairs of the Association shall be managed by a Council, which shall consist for the first year of John U. Lloyd, Maurice W. Alexander, Alexander K. Finlay, Karl Simmon, Samuel A. D. Sheppard, John M. Maisch, James Vernor, C. Lewis Diehl, William H. Rogers, William Saunders, Albert E. Ebert, Philip C. Candidus, George W. Kennedy, Albert H. Hollister, James M. Good, Lewis C. Hopp and William Dupont.

Given under our respective hands and seals this 12th day of December, A. D. 1887.

Signed:	JOHN U. LLOYD,	MAURICE W. ALEXANDER,
	ALEX. K. FINLAY,	KARL SIMMON,
	SAMUEL A. D. SHEPPARD,	JOHN M. MAISCH,
	JAMES VERNOR,	C. LEWIS DIEHL,
	WILLIAM H. ROGERS,	WM. SAUNDERS,
	ALBERT E. EBERT,	PHILIP C. CANDIDUS,
	GEORGE W. KENNEDY,	ALBERT H. HOLLISTER,
	JAMES M. GOOD,	LEWIS C. HOPP,
		WILLIAM DUPONT,
Members of the Council,		
And	JOHN A. MILBURN,	G. G. C. SIMMS,
	E. B. BURY,	Z. W. CROMWELL,
	W. S. THOMPSON,	JOHN R. MAJOR,
	CHARLES CHRISTIANI,	W. G. DUCKETT,
	A. J. SCHAFHIRT,	GEO. W. BOYD,
	O. H. COUMBE,	HENRY A. JOHNSTON,
	GEO. B. LOCKHART,	W. C. MILBURN,
	T. C. MURRAY,	ARTHUR NATTANS,
	JOSEPH R. WALTON,	THOMAS M. WEHRLY,

of the District of Columbia.

(Notaries' certificates attached to the original document attest the genuineness of each and every signature.)

Received for Record February 21st, 1888, at 1:05 P. M., and recorded in Liber No. 4, fol. 302, Acts of Incorporation, District of Columbia, and examined.

Signed: JAMES M. TROTTER, *Recorder.*

SEAL:
Office of Recorder of Deeds,
District of Columbia,
Washington, D. C.

CONSTITUTION AND BY LAWS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulterations.

2. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a Permanent Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom, with the exception of the Permanent Secretary, shall be elected annually; also a Local Secretary to be elected by the Council; and shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting, when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution.

BY-LAWS.

CHAPTER I.

Of the President and Vice-Presidents.

ARTICLE I. The President shall preside at all general sessions of the Association, except those of the special Sections, as hereinafter provided. In the event of his absence or inability to serve, one of the Vice-Presidents, or in the absence of all a President *pro tempore*, shall perform the duties of President.

ARTICLE II. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*.

ARTICLE III. At the sessions the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports and communications, and order the vote upon all proper questions at the proper time.

ARTICLE IV. In all balloting, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal; and in case of such equal division, the motion is lost.

ARTICLE V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in case of personality and impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in case where he prefers to submit the matter to the members; decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order.

ARTICLE VI. He shall have the right to call a member to the chair, in order that he may take the floor in debate. He shall see that the Constitution and By-Laws are properly enforced.

ARTICLE VII. He shall appoint all committees, not provided for in the By-Laws or otherwise directed by the Association.

ARTICLE VIII. He shall sign the certificates of membership, and countersign all orders on the Treasury. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER II.

Of the Permanent Secretary.

ARTICLE I. The Permanent Secretary shall be elected to hold office permanently during the pleasure of the Association. He shall receive from the Treasurer an annual salary of $750, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE II. He shall keep fair and correct minutes of the proceedings of the general sessions, and carefully preserve, on file, all reports, essays, and papers of every description presented to the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Report of the Proceedings of the Association, under the direction of the Council.

ARTICEE III. He shall read all papers handed him by the President for that purpose; shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every standing and special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act. He shall notify every member at least two weeks in advance of the time and place of each annual meeting.

CHAPTER III.

Of the Local Secretary.

ARTICLE I. The Local Secretary shall reside at or near the place where the next annual meeting of the Association is to be held.

ARTICLE II. He shall assist the Permanent Secretary in his duties: shall co-operate with the Council and any Local Committee in making arrangements for the annual meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

ARTICLE III. An exhibition of objects interesting to pharmacists may be held each year, should the Council so determine, under the direction of the Local Secretary and the Committee on Commercial Interests.

CHAPTER IV.

Of the Treasurer.

ARTICLE I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

ARTICLE II. He shall pay no money except on the order of the Secretary, countersigned by the President, and accompanied by the proper vouchers.

ARTICLE III. He shall report to the Council, previous to each annual meeting, the names of such members as have failed to pay their annual dues for three years.

ARTICLE IV. He shall present a statement of his accounts at each annual meeting of the Council, that they may be audited; he shall receive an annual salary of $750, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE V. The Treasurer, in order that he may qualify for the office to which he has been elected, shall file a good and sufficient bond or bonds to the amount of $5,000 with the Chairman of the Council for the faithful performance of his duties as Treasurer, this bond or bonds to be signed and executed by two sureties or a Trust Company acceptable to the Council.

CHAPTER V.

Of the Reporter on the Progress of Pharmacy.

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services an annual salary of $750.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the Permanent Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the Permanent Secretary for preservation.

ARTICLE III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry and Materia Medica, and the collateral branches of knowledge; on the changes in conditions of Pharmaceutical Institutions; together with such statistical and biographical notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented completed at the annual meeting, unless such meeting is held previous to August 1.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the Permanent Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

CHAPTER VI.

Of the Council.

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which is empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association. Any member of the Association may attend the meetings of the Council, and may, by vote of the Council, be permitted to speak on any subject under discussion.

ARTICLE II. The Council shall consist of twenty-one members, nine of whom, selected from such members as have had at least three years' membership in this Asso-

ciation, shall be elected by ballot by the Association in the following order: Three of them to serve for one year, three for two years, three for three years. At each subsequent annual meeting, three members shall be elected to take the places of those whose terms will then expire, to serve for the term of three years. None but *ex-officio* members of the Council shall be eligible for re-election thereto until one year after the expiration of their terms of office.

ARTICLE III. The President, Vice-Presidents, Secretary, Local Secretary, Treasurer, Reporter on the Progress of Pharmacy, the Chairmen of the Sections of the Association, and the Secretary of the Council, shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and a Secretary, to be elected by ballot annually by the Council. The Secretary may or not be a member of the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association from one annual meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the annual meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council—a Committee on Membership, a Committee on Publication, and a Committee on Finance—to whom shall be referred such duties as are appropriate to their respective functions, as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

ARTICLE VIII. *Section* 1. The Council shall have charge of the revision of the roll and the publication of the Proceedings.

Section 2. The Secretary of the Council shall read at each of its sessions the names of those candidates for membership which have been proposed, when a vote of two-thirds shall be sufficient to recommend them to the Association.

Section 3. The Council shall decide upon any objections which may be presented to them (which must be in writing, with the member's name attatched), referring to the fitness of the candidates for membership; and no name shall be voted on by the Association without first receiving the approval of the Council.

Section 4. The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears, one copy of the annual Report of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sessions of the Association and of the Sections, a complete synopsis of the minutes of the Council, the reports of the President and Committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as it may deem worthy of insertion. It shall also fix the price at which the Proceedings may be sold.

CHAPTER VII.

Of Membership.

ARTICLE I. Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry and Botany, who may be especially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of the Constitution and By-laws, subscribe to them, are eligible to membership; provided that no one, whose name has been dropped from the roll for non-payment of dues, shall be eligible for membership until payment has been made of the three years' dues for which he is in arrears.

ARTICLE II. Any two members of the Association may propose to the Council the name of any person eligible to membership, and if approved, the Council shall recommend the person named to the Association, and post the name in some suitable place in the meeting hall, near the beginning of a session: objection, if any, to be made in writing, to the Secretary of the Council, previous to the Association taking any action on the proposition. Near the close of the same, or at a subsequent session, the Association may, by vote, elect such person a member, after which his membership shall be completed by his signing the Constitution and By-Laws, and paying the annual dues for the current year.

ARTICLE III. Every member shall pay in advance to the Treasurer the sum of *Five Dollars* as his yearly contribution, and by neglecting to pay said contribution for *three successive years* he may be dropped from the Roll.

ARTICLE IV. Any member not in arrears to the Association, who shall pay to the Treasurer the sum of $75 during the first year of his connection therewith, or after five years $70, or after ten years $60, or after fifteen years $50, or after twenty years $40, or after twenty-five years $30, or after thirty years $20, or after thirty-five years $10, also any member who shall have paid to the Treasurer annual dues for forty years, shall become a life member, and shall be exempt from all future annual contributions.

ARTICLE V. All local organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the annual meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year: Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials should be sent to the Permanent Secretary *at least two weeks* in advance of the annual meeting.

ARTICLE VI. Members shall be entitled, on the payment of *Five Dollars*, to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, Permanent Secretary, and the Treasurer.

ARTICLE VII. Resignations of membership shall be made in writing to the Permanent Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE VIII. Any member may be expelled for improper conduct, or the violation of the Constitution, By-Laws, or Ethics, adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at a general session.

ARTICLE IX. Pharmacists, chemists, and other scientific men who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office or vote at the meetings.

CHAPTER VIII.

Of Meetings and Sections.

ARTICLE I. The meetings shall be held annually: Provided, that in case of failure of this, from any cause, the duty of calling the Association together shall devolve upon the President, or one of the Vice-Presidents, with the advice and consent of the Council.

ARTICLE II. To expedite and render more efficient the work of the Association, three Sections shall be formed, as follows; 1. Section on Scientific Papers; 2. Section on Commercial Interests; 3. Section on Pharmaceutical Legislation and Education.

ARTICLE III. The business of the Association shall be arranged so that the labors of each Section shall be considered only at the session or sessions to which they are especially assigned.

ARTICLE IV. The first, second and last sessions of the annual meeting shall be devoted to the general business of the Association, and sufficient time shall be assigned to the Association at the beginning of all other sessions to read its minutes, act on the report of Council on membership, and receive propositions for amendments to the By-Laws.

ARTICLE V. At the third session the business of the Section on Commercial Interests shall be considered.

ARTICLE VI. The fourth, fifth and sixth sessions shall be devoted to the reading of Scientific Papers and the discussions thereof.

ARTICLE VII. At the seventh, eighth and ninth sessions the Section on Pharmaceutical Legislation and Education shall consider the business assigned to that Section.

ARTICLE VIII. A Chairman and a Secretary shall be elected by ballot by each Section to serve at the sessions of said Section. The minutes of each session, together with all documents and papers which belong to each Section, must be placed as soon as possible in the hands of the Permanent Secretary for publication or safe-keeping.

ARTICLE IX. The Chairman of each Section shall preside at each of its sessions, and shall prepare a short address treating upon the subjects connected with his Section, to be read before the Section at the annual meeting.

ARTICLE X. There shall be elected by each Section a Committee, of which the Chairman of the Section shall be Chairman, to whom shall be delegated the duty of arranging in advance the business to come before the Section at the next annual meeting; these committees in each case becoming Standing Committees of the Association.

ARTICLE XI. The order of business at the first session of each annual meeting shall be as follows:

Section 1. Promptly at the time named in the notice issued for the meeting, the President, or in his absence one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall officiate.

Section 2. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the Permanent Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4. The President's address may then be read, after which the Council shall report the list of properly accredited delegates.

Section 5. Reports of Committees shall be presented, read by their titles, synopsis or in full, and laid on the table for future consideration.

Section 6. The President shall call the roll of States, the Territories, District of Columbia and the provinces of Canada, requesting the members present from each State or Territory to appoint two members, the persons so selected to act as a Committee to nominate officers for the Association and members of the Council for the ensuing three years; in addition to which the President shall appoint five members from the Association at large to act with the Committee. Delegates who are not members must complete their membership before they are eligible to serve on the Nominating Committee.

Section 7. The minutes of the Council shall be read in full at the annual meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present; or, if disapproved by a majority of the members present, its acts shall be revised, so as to be acceptable to the Association.

Section 8. A committee of five on time and place of meeting shall be appointed by the President at the first session, to report at the second session.

Section 9. Incidental business.

ARTICLE XII. The order of business at the second general session at each annual meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding session, which may be amended, if necessary, and shall then be approved.

Section 3. The Report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the persons nominated shall be balloted for.

Section 4. The Council shall present names of persons recommended for membership.

Section 5. Reports of Standing Committees shall be read.

Section 6. Reports of Special Committees shall be read.

Section 7. Incidental business.

ARTICLE XIII. The order of business for the sessions of the Sections shall be determined by each Section for itself.

ARTICLE XIV. No money shall be appropriated from the Treasury by any of the Sections.

ARTICLE XV. At the last general session of the Association the newly elected officers of the Association shall take their respective places.

ARTICLE XVI. The Council may arrange for such social sessions, to be held after the adjournment of the last general session, as it may deem expedient, but no business of the Association can be transacted at these social sessions.

CHAPTER IX.

Of Committees.

ARTICLE I. There shall be appointed or elected seven Standing Committees as follows: a Committee on Commercial Interests, a Committee on the Revision of the Pharmacopœia, and a Committee on Pharmaceutical Legislation and Education, each to consist of five members; a Committee on Scientific Papers, a Committee on the Ebert Prize, a Committee on General Prizes, each to consist of three members; and a Committee on Transportation, to consist of ten members.

ARTICLE II. The Committee on Commercial Interests shall be elected by the Section on Commercial Interests. It shall be charged with the work of arranging in advance the business to come before the Section at the next annual meeting. It shall propose each year a subject for discussion at the meetings of the State Associations, and at the following annual meeting of this Association shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE III. The Committee on Scientific Papers shall be elected by the Section on Scientific Papers. It shall arrange the business of the Section, and shall report a number of questions of scientific and practical interest, the answers to which may advance the interests of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

ARTICLE IV. Any person writing a paper for the Association must, to insure its publication in the Proceedings, refer the same to the Committee of the particular Section to which it refers, previous to the first session.

ARTICLE V. The Committee on the Ebert Prize, which shall be appointed by the Chairman of the Section on Scientific Papers, shall, within six months after the annual meeting at which essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all respects it shall be governed by the stipulations expressed by the donor.

ARTICLE VI. The Committee on General Prizes, which shall be appointed by the President, shall within six months after the annual meeting, at which the papers are presented, determine which, if any of them, are worthy of prizes, and decide upon the relative merits of such papers as are deemed worthy.

ARTICLE VII. The Committee on Pharmaceutical Legislation and Education, which shall be elected by the Section on Pharmaceutical Legislation and Educatlon, shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. It shall report at each stated meeting of the Association what legislation on pharmaceutical subjects has occurred during the year. It shall arrange the business of the Section in advance of its sessions, propose suitable subjects for discussion, and shall attend to such duties as may be delegated to it by the Section.

ARTICLE IX. The Committee on Revision of the United States Pharmacopœia shall be appointed by the President of the Association. It shall collect and codify such facts as may serve as a basis of the report to be presented by this Association to the National Convention for revising the Pharmacopœia. It shall collect statistics regarding the frequency with which official and non-official remedies are used in legitimate practice,

and shall endeavor to ascertain the general wishes and requirements of the profession throughout the country in regard to any desired changes or improvements in the Pharmacopœia. It shall also note errors of any kind found in the U. S. Pharmacopœia so as to facilitate and aid the work of the National Committee on Revision of the U. S. P.

ARTICLE X. The Committee on Transportation, which shall be elected by the Council, shall consist of one member each from the cities of Boston, New York, Chicago, St. Louis, Cincinnati, New Orleans, Atlanta, St. Paul, Denver and San Francisco, and in conjunction with the Local Secretary, who shall be a member of the Committee and Chairman thereof, shall arrange for transportation from the different sections of the United States and Canada to the place of meeting and return.

CHAPTER X.

Rules of Order and Debate.

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the assembly and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order named. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

CHAPTER XI.

Miscellaneous.

ARTICLE I. On all points of order not covered in these By-Laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

ARTICLE II. Every proposition to alter or amend these By-Laws shall be submitted in writing at a general session, and may be balloted for at any subsequent general session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-Laws.

ARTICLE III. No one or more of these By-Laws shall be suspended.

BY-LAWS OF THE COUNCIL.

CHAPTER I.

ARTICLE I. The Officers of the Council shall consist of a Chairman, a Vice-Chairman and a Secretary, who shall be elected by ballot by the Council, to serve one year.

ARTICLE II. They shall be elected and shall assume the duties of their respective offices immediately after the election of the new members of the Council by the Association.

CHAPTER II.

Of the Chairman and Vice-Chairman.

ARTICLE I. The Chairman shall preside at all meetings of the Council; in his absence or on account of inability from any cause, the Vice-Chairman, or, in the absence of both, a Chairman *pro tempore*, shall perform the duties of Chairman.

ARTICLE II. The Chairman of the Council shall confer with the Chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

CHAPTER III.

Of the Secretary.

ARTICLE I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council. He shall receive an annual salary of $50.

ARTICLE II. He shall post in a conspicuous place in the meeting-room the names of the applicants for membership.

ARTICLE III. He shall read all the papers handed him by the Chairman for that purpose; shall call and record the yeas and nays whenever they are required to be called; he shall notify the Chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting of the Council.

CHAPTER IV.

Committee on Membership.

ARTICLE I. The Committee on Membership shall consist of five members of the Council, to be elected annually by ballot. The Permanent Secretary and the Treasurer of the Association shall be *ex-officio* members of this committee. The committee shall elect its chairman immediately after the election of its members by the Council.

ARTICLE II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present to the Council the list of applicants for membership who have complied with the requirements of the By-Laws of the Association.

ARTICLE III. It shall furnish appropriate biographical sketches of deceased members for publication in the Report of the Proceedings.

ARTICLE IV. The Secretary of the Committee shall receive an annual salary of $150.

CHAPTER V.

Of Committee on Publication.

ARTICLE I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council. Immediately after its election by the Council, the Committee shall elect a Chairman.

ARTICLE II. The Committee on Publication shall have charge of the publication and distribution of the Report of the Proceedings.

CHAPTER VI.

Of Committee on Finance.

ARTICLE I. The Committee on Finance shall consist of three members, who shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

CHAPTER VII.

Of the Centennial Fund.

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the Permanent Secretary. It shall receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount and cost of material required—it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. The Committee shall consider these applications, and at as early a date as possible shall report to the Council an outline of the proposed investigations, together with such recommendations of grants from the available funds as it may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and in case the grants be approved, the Chairman of the Council shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

CHAPTER VIII.

Of Sessions.

ARTICLE I. The Council shall meet previous to the assembling of the Association, and at such other times as it may determine, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special session shall be called.

ARTICLE III. Five members of the Council shall constitute a quorum.

ARTICLE IV. The order of business at the first session of the Council shall be as follows:

1. Organization by the election of the Chairman, Vice-Chairman, and the Secretary.
2. Election of the Standing Committees of Council, as follows:

a. Committee on Membership, consisting of five members of the Council, the Permanent Secretary and the Treasurer.

b. Committee on Finance, three members.

c. Committee on Publication, five members.

d. Committee on Centennial Fund, three members.

3. Unfinished and deferred business from the last Council, or such business as is especially referred to the Council from the Association.
4. The reading of the names of new members as provided in the By-Laws.
5. Reading of reports and appointment of committees.
6. New business.
7. Adjournment—and before the final adjournment, the minutes of the last session of the Council shall be read and approved.

CHAPTER IX.

Miscellaneous.

ARTICLE I. Three members of any of the Standing Committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its Committees, and which can be disposed of by a positive or negative vote, the Chairman of the Council, or the Chairman of the Committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present. The ayes and nays of such votes taken by the Council shall be entered upon the minutes.

ARTICLE III. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at the next session of the Council, when upon receiving the vote of three-fourths of the members present, it shall become a part of these By-Laws.

SECTION ON COMMERCIAL INTERESTS.

ORDER OF BUSINESS.

1. Calling the Section to order.
2. Reading of the Chairman's Address.
3. Reports of Committees.
4. Reading of Papers.
5. New Business and Discussion.
6. Nomination and Election of Officers for the ensuing year.
7. Installation of Officers.
8. Reading of the Minutes.
9. Adjournment.

SECTION ON SCIENTIFIC PAPERS.

ORDER OF BUSINESS.

First Session of the Section.

1. Calling the Section to order.
2. Reading of the Chairman's address.
3. Reports of Committees, if there be any to make, and appointment of such new Committees as may appear desirable.
4. Nominations (but not elections at this sitting) for the new officers of the Section. The names of members nominated to be posted in the hall on the adjournment of this session. The election not to take place until after the opening of the next session, when further nominations may also be made if it is deemed desirable.
5. Reading of Papers and discussions on the subjects brought up.
6. Adjournment.

Second Session of the Section.

1. Reading of Minutes of the previous Session.
2. Election of New Officers for the ensuing year.
3. Reports of Committees—Incidental Business.
4. Reading of Papers and Discussion.
5. Adjournment.

Third Session of the Section.

1. Reading of Minutes of the previous Session.
2. Reading of Papers and Discussion.
3. Reports of Committees.
4. Installation of Officers.
5. New Business.
6. Reading of Minutes.
7. Final Adjournment.

SECTION ON EDUCATION AND LEGISLATION.

ORDER OF BUSINESS.

First Session of the Section.

1. Calling the Session to Order.
2. Reading of the Address of the Chairman.
3. Reports of Committees.
4. Nominations of Officers for the ensuing year. The election to take place at the opening of the second session.
5. Reading of Papers and Discussion.
6. Adjournment.

Second Session of the Section.

1. The Reading of Minutes of the previous Session.
2. The Election of Officers.
3. Reports of Committees—Incidental Business.
4. Reading of Papers and Discussion.
5. Adjournment.

Third Session of the Section.

1. The Reading of Minutes of the previous Session.
2. Reading of Papers and Discussion.
3. Reports of Committees.
4. Installation of Officers.
5. New Business.
6. Reading of Minutes.
7. Final Adjournment.

GENERAL RULES OF FINANCE.

ADOPTED 1883, AMENDED 1885, 1887, 1888, 1895.

First, The Treasurer shall deposit all moneys received by him, except those belonging to the various "Funds," with some reliable banking company, where said money may be drawing interest for the benefit of the Association, said banking company to be designated by the Finance Committee, and approved by the Council.

Second, Said money shall be deposited in the name of the American Pharmaceutical Association, and all checks shall be drawn by the Treasurer, and shall be countersigned by the Chairman of the Council.

Third, All bills due by the Association shall be paid by numbered checks on said banking company, the checks, when returned to the Treasurer, to be attached to the several vouchers.

Fourth, The Treasurer shall make a deposit in the bank whenever the money in his hands shall amount to fifty dollars.

Fifth, The Chairman of the Council shall be the custodian of the bonds and saving-bank books, representing the several Funds belonging to the Association; and bonds and bank-books shall be in the name of the Treasurer, and the accounts of the same shall be kept by him; duplicate accounts to be kept by the Chairman of the Council, who shall make an annual report of the same to the Association.

Sixth, There shall be annually appointed, by the Council, an Auditing Committee, this Committee to consist of three members residing in or near the same city or town, the Chairman to be a member of the Finance Committee.

Seventh, The Treasurer shall balance his books July 1st of each year, and shall make out, previous to the fifteenth day of July following, his annual report for the financial year just closed.

Eighth, The Treasurer having thus balanced his books and made out his report, shall forward all his books, accounts, vouchers, etc., with the report, to the Chairman of the Auditing Committee, at such time and place in July of each year as said Chairman may direct.

The Chairman of the Council shall forward to the Chairman of the Auditing Committee, at the same time and place, the bonds, saving-bank books, and accounts of the same that may be in his hands.

Ninth, Said books, accounts, vouchers, etc., shall be returned to the Treasurer, and said bonds, saving-bank books and accounts of the same to the Chairman of the Council, all within two weeks of the date of their reception by the Chairman of the Auditing Committee.

Tenth, There shall be a meeting of the Auditing Committee in July of each year, and it shall be the duty of said Committee, at such meeting, to carefully examine all the books, accounts, vouchers, funds, etc., etc., received by them; and previous to the 1st day of August following, to make a report thereon, in writing, to the Chairman of the Council.

Eleventh, The expense of the bond of the Treasurer, given by a Trust Company, shall be paid for from the Treasury.

Twelfth, The Treasurer shall furnish with his annual report an alphabetical list of the names of the members from whom he has received money for dues and certificates during the financial year, for publication in the Proceedings.

Thirteenth, The Finance Committee shall each year, previous to June 1st, present to the Council for its consideration a list of appropriations to cover the various expenditures of the coming fiscal year, the total of such appropriations to be based on the probable amount to be received from the annual dues for the coming year. No payment shall be made in excess of said appropriation except by special vote of the Council.

FORM OF APPLICATION FOR MEMBERSHIP.

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them. I also enclose the annual contribution, five dollars, for the first year of my membership.

Name in full.....

Number and Street.....

Town and State.....

Recommended by the undersigned two members in good standing:

.....

.....

FORMS OF PROPOSITIONS AND OF COMPLETING MEMBERSHIP IN ACCORDANCE WITH CHAPTER VIII., ARTICLE II., OF THE BY-LAWS.

THE undersigned members in good standing, being personally acquainted with the following persons eligible to membership in accordance with Chapter VII., Article I. of the By-Laws, testify to their moral character, their skill as practical druggists and pharmacists, and their professional probity and good standing, and they recommend them for membership in the American Pharmaceutical Association.

NAMES OF CANDIDATES. ADDRESS.

Proposed by.....

.....

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them, and enclose the annual contribution, five dollars, for the current year.

Name in full.....

Date .....

Address.....

.....

To be sent to Geo. W. Kennedy, Secretary of the Committee on Membership Am. Ph. Assoc., Pottsville, Penn.

ROLL OF MEMBERS.

HONORARY MEMBERS.

FOREIGN COUNTRIES.

AUSTRIA.

Anton von Waldheim, *Vienna*, 1871.

BELGIUM.

A. T. De Meyer, *Brussels*, 1868.
Norbert Gille, *Brussels*, 1868.

ENGLAND.

Dr. John Attfield, *London*, 1871.
Michael Carteighe, *London*, 1882.
Thomas Greenish, *London*, 1882.
Joseph Ince, *London*, 1882.
Richard Reynolds, *Leeds*, 1832.
Geo. F. Schacht, *Clifton*, *Bristol*, 1882.

FRANCE.

Dr. G. Planchon, *Paris*, 1877.

GERMANY.

Dr. Hermann Hager, *Frankfurt a. d. Oder*, 1868.
Dr. Carl Schacht, *Berlin*, 1882.
Dr. Edward Schaer, *Strassburg*, 1877.
Dr. G. Dragendorff, *Rostock*, 1868.

NETHERLANDS.

Dr. J. E. De Vrij, *Hague*, 1871.

RUSSIA.

J. von Martenson, *St. Petersburg*. 1882.

ACTIVE MEMBERS.

Members are requested to report any inaccuracies in these lists, and to notify the Secretary and Treasurer of all changes of address.

(The names of Life Members in SMALL CAPS. Names of Life Members under the old Constitution in *italics*.)

UNITED STATES OF AMERICA.

ALABAMA.

Auburn.

Miller, Emerson Romeo 1895

Mobile.

Bauer, David Samuel 1894
Brown, Albert Edward 1887
Candidus, Philip Charles 1857
McAfee, John James. 1890
Mohr, Charles 1871
Mohr, Charles A. 1894
Moore, Thomas Ferguson. 1894
Ortmann, John Henry 1894
Punch, William Francis 1874
Smith, Thomas Edmond 1894
Tucker, Mosely Fleming 1888
Van Antwerp, Andrew 1890
Van Antwerp, Garet 1880

Montgomery.

Andrew, Edgar Cecil. 1895
Dent, Warren Fillmore 1895
Knabe, Gustavus Alexander 1876

Selma.

Galt, Edward Pegram 1883

ARIZONA.

Fort Bowie.

Fougué, Joseph 1893

Phœnix, Maricopa Co.

Eschman, Clemens Louis 1889
Furl, Irwin William 1894

Prescott.

Brisley, Harry 1894

Tempe.

Hudson, Taliaferro Flournoy 1894

ARKANSAS.

Batesville.

Fletcher, John Wade. 1894

Camden.

Morgan, Aylmer Lee. 1890

Diamond P. O.

Laird, John. 1895

Fort Smith.

Morton, John Walker 1894
Sparks, James Mitchell 1894

Hot Springs.

Carr, Will Lafoece. 1894
Klein, Ernest Frederick 1894

Little Rock.

Bond, John Barnitz 1883
Dowdy, Joseph Franklin, Jr. 1894
Gibson, James Edwin 1887
Jungkind, John August 1887

Morrillton.

Dashiell, Robert Moore 1894

Pine Bluff.

Anderson, James McPhuter 1893
Dewoody, William Lawrence 1887
Valliant, George Enos 1891

Pocahontas.

Skinner, William Henry 1894

Russellville.

Kerr, William Whitman 1887

Searcy.

Robertson, Felix Otey.....1890

Van Buren.

Kerr, Frank Gault 1890

CALIFORNIA.

Alameda, Alameda Co.

Elbe, Constantine Berthold.....1877

Bakersfield, Kern Co.

Drury, John Stimson 1889

Centreville, Alameda Co.

Lernhart, August ... .1889

Fruit Vale, Alameda Co.

Neppach, Stephen Alfred.....1889

Haywards, Alameda Co.

Hassler, Alfred Jacob 1891

Lakeport.

Myers, George Welton 1894

Los Angeles.

Apel, Frederick Edmond.....1892
Kirkland, Derwentwater 1889
Parr, John Conrad.....1856
Rives, Edward B.....1889

Marysville, Yuba Co.

Flint, John Henry 1889

Merced.

Troppmann, Charles Martin 1893

Monterey.

Hilby, Francis Martin 1886

Napa.

Levinson, Joseph ... .1895

Oakland.

Flint, George Benjamin.....1889
Melvin, Samuel Houston.....1889

Oroville, Butte Co.

Cummins, J. Wirt.....1891
Ekman, Nils Adolf.....1889
Green, Robert Moore 1889

Pasadena.

Bley, Alphonso Albert Willetts 1889

Sacramento.

Helke, William Ludwig 1889
Ray, Frederick Edwards 1889

San Francisco.

Argenti, Jerome John Baptiste.....1893
Bayly, Charles Alfred..... ...1889
Calvert, John.....1870
Dawson, John Henry.....1882
Grossman, Edward Lorenzo.....1893
Hunt, Denis Denvin 1889
Joy, Edwin Wolcott.....1882
Moffit, Thomas Sebatier 1861
Schmidt, Valentine 1887
Searby, William Martin.....1882
Seifert, Charles Albert.....1893
Steele, James Gurden 1859
Weihe, Otto Albert 1893
Wenzell, William Theodore 1870
White, Richard Edward 1889

Santa Clara.

Oberdeener, Samuel.....1889

Santa Cruz.

Fay, Hamilton 1889

Santa Monica.

Devine, John.....1887

Stockton.

Smith, William Clay.....1889

Vacaville.

Miller, James Monroe 1889

Vallejo, Solano Co.

Topley, James.....1869

COLORADO.

Aspen.

Long, Jonathan C.....1892

Central City.

Best, John 1866
Davies, Llewellyn Powell 1891

Chandler.

Harris, William Stillwell.....1893

Colorado Springs.

Ward, Augustus Jae.....1893

Denver.

Beitenman, William Wallace 1888
Black, John Reid 1891
Ford, Charles Mangan.....1887
Hover, William Adgate.....1895
Kline, Charles Sol.....1891

Kochan, John 1888
Lord, Frank Jotham 1889
McCrea, Harry Francis 1895
Naly, Sarah Lusan 1895
Scholtz, Edmund Louis 1881
Stebbins, Harry Frank 1891
Steinhauer, Frederick 1881
Walbrach, Arthur 1881
Ward, Charles Edward 1895

Fort Collins.

Scott, Alexander Wear 1893

Glenwood Springs, Garfield Co.

Ewing, Frederic Charles 1889

Hugo.

Clowes, William Legh 1895

Leadville.

Taylor, George Edward 1895

Littleton.

Depeyre, Louis Nolël 1894

Longmont.

Turrell, Judson Wade 1893

Lyons.

Crona, Sixtus Edward Seine 1885

Pueblo.

Cambier, Jacob 1895
Wells, Charles Horten 1893

South Denver.

Soetje, Edward Conrad 1888

West Denver.

Huecker, John 1891

COLUMBIA, DISTRICT OF.

Washington.

Bradbury, Wymond Henry 1895
Boyd, George Washington 1883
Christiani, Charles 1874
Coblentz. Joseph Daniel 1894
Criswell, Francis McClure 1892
Duckett, Walter G. 1876
Easterday, Herbert Clifton 1893
Eppley, James Kerr 1895
Flemer, Louis 1895
Henry, Frank Clifton 1894
Herbst, William Parker 1895
Hilton, Samuel Louis 1890
Hurlebaus, George William 1895
Hutton, Harry Dubant 1891
Johnston, Henry Augustus 1883
Major, John Richards 1873
Martin, John Charles 1883
McComas, Percy Grant 1892
Mulcahy, Daniel Domnick 1895
Nattans, Arthur 1883
Read, Albert M. 1894
Schafhirt, Adolph Julian 1876
Simms, Giles Green Craycroft 1860
Thompson, William Scott 1871
Wehrly, Thomas McAleer 1883

CONNECTICUT.

Ansonia.

Smith, Samuel Wheeler 1889

Bridgeport.

Fisher, Elbert Ellsworth 1892

Hartford.

Chapin, Frederick Hastings 1880
Edwards, Frederick Bulkeley 1894
Goodwin, Lester Henry 1875
Newton, Philo Woodhouse 1892
Rapelye, Charles Andrew 1876
Shannon, Thomas Ross Alvin 1892
Stoughton, Dwight George 1890
Tracy, David Wallace 1892
Williams, John Kirby 1875

Jewett City.

Chabot, David Pierre 1895

Litchfield.

Gates, Howard Eugene 1873

Meriden.

Mosher, William Wooster 1894

Middletown.

Pitt, John Richard 1872

Naugatuck.

May, James Oscar 1875

New Britain.

Perkins, Charles William 1892

New Canaan.

Winters, John Henry 1888

New Haven.

Dimock, Robert Hemphill 1889
Eagny, James Thomas 1894
Gessner, Emil Adolph 1878
Hogan, John Joseph 1890
Spalding, Warren Alphonso 1876
Sperry, Herman Jay 1880
Wood, Alonzo Felton, Jr. 1890
Wood, James Prior 1890

New London.

Nichols, John Cutter 1886

Noank, New London Co.

Miner, Orrin Eugene 1894

Norwich.

Duggan, James 1894
Osgood, Hugh Henry 1875
Sevin, Nathan Douglas 1875

Putnam.

Dresser, George Edward 1886

Thomaston.

Williams, Charles Fish 1888

Thompsonville, Hartford Co.

Smith, Edward Newton 1885
Steele, George Robert 1892

Waterbury.

Wilcox, Frederick 1878
Woodruff, Roderick Samuel 1876

West Winsted.

Phelps, Dwight 1873

Willimantie.

Wilson, Frank Milton 1883

DELAWARE.

Wilmington.

Belt, James Ferris 1892
Belt, Zedekiah James 1876
Harvey, John Marsh 1890
Smith, Frank Roop 1890
Smith, Linton 1870
Watson, Herbert Kennedy 1888

FLORIDA.

Apopka, Orange Co.

Kent, Robert Restieaux 1855

De Land.

Fisher, George Washington 1893

Fort George.

Rollin, John Francis 1859

Jacksonville.

Aird, William 1887
Crum, John Darius 1892
Dell, William Amos 1890
Martinez, Robert John 1893

Key West.

De Armona, Joseph Raymond 1893
Plummer, Joseph Wellesley Verneuil Rouchefoucauldt 1892

Myers, Lee Co.

Williams, Edward Marshall 1892

Ocala.

Delouest, Edward 1890

Pensacola.

Cushman, Henry Clay 1887

St. Augustine.

Smith, Lauriston Stephen 1892
Woodman, Walter Irving 1893

Tallahassee.

Schrader, Herman von Roden 1891

Tampa.

Leonardi, Sydney Beauregard 1890

Titusville, Brevard Co.

Dixon, John Marion 1894

GEORGIA.

Americus.

Murray, Emmett Leroy 1894

Atlanta.

Avary, Moody Burt 1892
Cartledge, Edward Cornelius 1893
Cronheim, Solomon 1892
Dunwody, Richard Gaillard 1881
Freeman, William Benjamin 1894
Jacobs, Joseph 1894
Kelly, Gilliam Jeter 1894
Payne, George Frederick 1893
Sharp, Harry 1890
Tyner, Charles Orlando 1892
Watson, Sidney Powell 1887

Augusta.

Durban, Sebastian Charles 1883
Land, Robert Henry 1859
Smith, James Perrin 1894

Columbus.

Turner, John Persons 1894
Wheat, Eli Marby 1892

Darien.

Cornell, Russell Wilbur 1893

Greenville.

Tigner, James Ogletree 1890

Jackson.

Wagner, William Ignatius 1892

La Grange.

Slack, Henry Richmond, Jr. 1890

Macon.

Brunner, Norman Isaac 1878
Cheatham, Thomas Alexander 1890
Ingalls, John 1876

Marietta.

Crosby, Charles Mayo 1893

Milledgeville.

Case, George Daniel 1891

Montezuma.

Walker, Joel Preston 1893

Palmetto.

Peniston, Paul 1893

Rome.

Curry, David W. 1894

Savannah.

MacDonald, Allan Douglas 1895
Rowlinski, Robert Antone 1892
Solomons, Isaiah Abram 1894

Summerville.

Arrington, Homer Houston 1892

Thomasville.

Bondurant, Charles Scott 1888
Thomas, Robert, Jr. 1888

IDAHO.

Caldwell.

Smithson, David Elmer 1890

Murray, Shoshone Co.

Ingalls, Albert Orfila 1885

ILLINOIS.

Arcola, Douglas Co.

Boyd, William Porter 1892

Aurora.

Staudt, Louis Carl 1890

Bloomington.

Green, Hamer Herschel 1892

Bradford, Stark Co.

Plummer, David Gorham 1869

Cairo.

Schuh, Paul Gustav 1894

Camp Point, Adams Co.

Bartells, George Case 1881

Carlinville, Macoupin Co.

Loehr, Theodore Christian 1888

Chicago.

Bartlett, Nicholas Gray 1864
Behrens, Emil Christian Louis 1893
Behrens, Paul Johannes Heinrich 1888
Biroth, Henry 1865
Bishop, Samuel Edward 1890
Bodemann, Wilhelm 1887
Bronson, George Styles 1893
Button, Charles Edwin 1881
Conrad, John 1887
Day, William Baker 1895
Dorner, Emil August 1892
Ebert, Albert Ethelbert 1864
Feldkamp, Charles Louis 1893
Fischer, Oscar Frederick 1892
Fleischer, Adolph Theodore 1888
Forsyth, William Kitchin 1892
Frerkson, Richard Christopher 1888
Fuller, Oliver Franklin 1869
Gale, Edwin Oscar 1857
Gale, William Henry 1857
Grassly, Charles William 1884
Gray, William 1892
Hallberg, Carl Swante Nicanor 1879
Hartwig, Charles Ferdinand 1881
Hartwig, Otto Julius 1892
Heddens, Claus Heising 1893
Hereth, Samuel Franklin 1893

Hogan, Louis Cass 1890
Hogey, Julius Henry 1880
Houghton, Harry James 1891
Jamieson, Thomas Nevin 1888
Kirchgasser, William Charles 1888
Klein, Frederick 1893
Klotz, August Edward 1895
Knudsen, Rudolph Hans 1892
Leenheer, Bastian 1891
Lehman, Louis 1895
Lord, Thomas 1882
Lundberg, John Christian 1892
Matthews, Charles Edward 1893
Miner, Maurice Ashbel 1880
Morland, Robert Lawson 1892
Odell, Willis Butler 1893
Oglesby, George Daniel 1891
Oldberg, Oscar 1873
Parsons, John 1865
Patterson, Theodore Henry 1869
Pattison, George Henry 1893
Porter, Millett Nathan 1892
Puckner, William August 1888
Rhode, Rudolph Ernst 1887
Sargent, Ezekiel Herbert 1864
Scherer, Andrew 1884
Schmidt, Florian Charles 1882
Schmidt, Frederick Michael 1887
Schwab, Leslie Watts 1892
Scott, J. McDonald 1892
Sempill, Walter Morrison 1892
Smith, Benjamin Franklin 1892
Tanke, Julius Ernst Ferdinand 1893
Truax, Charles 1882
Voge, Richard 1893
Wheeler, Charles Gilbert 1892
WHITFIELD, THOMAS 1865
WOLTERSDORF, LOUIS 1865
Wooten, Thomas Victor 1893
Zahn, Emil Augustus 1881

Du Quoin.

Carr, Jerome Carroll 1895

East St. Louis.

Knoebel, Thomas 1892

El Paso, Woodford Co.

Strathmam, Charles August 1888

Grand Crossing.

Pattison, Charles Henry 1891

Highland.

Mueller, Adolphus 1871

Kankakee.

Rogers, Henry Horace 1895

La Salle.

Adamick, Gustave Hattenhauer 1891
Hattenhauer, Robert Christopher 1881

Lincoln.

Reed, Charles Cornean 1892

Moline.

Sohrbeck, George Henry 1888

Momence.

Culver, Anson Allen 1890

Pekin.

Ehrlicher, Henry Michael 1892

Peoria.

Benton, Wilber Merritt 1888
Lueder, Fritz 1894
Vonachen, Frank Herman 1895
Zimmermann, Albert 1893
Zimmermann, Charles 1881

Peru, La Salle Co.

Danz, Martin 1895

Rockford.

Sawyer, Willey Warren 1893

Rock Island.

Wyckoff, Elmer Ellsworth 1894

Saybrook.

Travis, Miles Beaty 1889

Streator.

Higby, William Herbert 1892

Stronghurst, Henderson Co.

Harter, Isaac Foster 1893

Vienna.

Simpson, William Calvert 1895

INDIAN TERRITORY.

Eufaula.

Moore, Charles Gates 1892

Wynnewood.

Hillebert, George Allen 1894

INDIANA.

Bourbon.

Weiser, William Augustus 1894

Columbus.

Stahlhuth, Ernst Henry William 1887

Edinburg.

Moffett, Thomas James.....1893

Evansville.

Schlaepfer, Henry John 1879

Fairmount.

Beasley, William Alexander.....1894
Edwards, Nathan Wilson.....1879

Garrett.

Stoehr, Julius John 1894

Indianapolis.

Carter, Frank Hahneman.....1891
Dill, John Byron 1878
Eads, Robert Isom..... 1895
Eichrodt, Charles William 1892
Field, Claud 1890
Frauer, Herman Emanuel.....1881
Huder, Henry J 1894
Hurty, John Newell.....1882
Leist, Jacob Lawrence.....1881
Lilly, Eli 1878
Lilly, Josiah Kirby.....1890
Pfafflin, Henry Adolph.....1892
Shake, Homer C..... 1892
Sloan, George White 1857
Zimmer, Harry Edgar 1892

Jeffersonville.

Loomis, John Clarence 1876

La Porte.

Meissner, Frederick William, Jr.....1890

Muncie.

Nickey, Frank Birch 1895

New Albany.

Henry, Charles Landon.....1893
Knoefel, Charles Deitrick 1894

Rockport, Spencer Co.

Anderson, Charles Burnett 1891

Seymour.

Andrews, Josiah Harding.....1879

South Bend.

Eliel, Leo 1882

Terre Haute.

Baur, Jacob 1879
Prentiss, John Brooks 1894

Warren.

Hickerson, William Henry.....1894

IOWA.

Britt.

Carton, John Arthur.....1895

Cascade, Dubuque Co.

Weber, John Henry.....1893

Clinton.

Majer, Oscar.....1880

Davenport.

Ballard, John Winthrop 1871
Harrison, Jacob Hugh.....1883

Des Moines.

Judisch, George 1890
Kaiser, William O 1893
Macy, Sherman Riley.....1891
McMichael, Americus Ojeda 1892
Ward, Milo Woodruff 1895

Dubuque.

Hervey, James 1892
Ruete, Theodore William 1870
Torbert, Willard Horatio 1887

Fort Dodge.

Oleson, Olaf Martin.....1877

Fort Madison.

Schafer, George Henry 1871

Garner.

Collins, Carrie Smith 1895

Iowa City.

Boerner, Emil Louis 1877

Keokuk.

Kiedaisch, John Frederick, Jr.....1893

Lost Nation.

McMeel, James Henry.....1895

Monticello.

Tiarks, Hermann 1876

Muscatine.

Braunwarth, Alice Louisa 1892
Krehe, John Theodor.....1884

Oskaloosa.

Pickett, John Harvey.....1887

Prairie City.

Johnson, Frank Wyatt.....1892

Sheldon.

Howard, Fletcher.....1895

Sioux City.

Arnold, Charles Frederick.....1891
Crady, Edward Edmond 1892
Moore, Silas Harwood..... 1880
Scherling, Gustav 1884

Stuart.

Treat, Joseph Augustus.....1885

Waterloo.

Wangler, Conrad David.....1876

KANSAS.

Argentine.

McGeorge, William 1895

Atchison.

Noll, Mathias 1891
Tomlinson, Burton Amos 1895

Galena.

Enterkine, James Edward.....1892

Gypsum City, Saline Co.

Schmitter, Jonathan.....1892

Hiawatha.

Miner, Mary Olds.....1892

Hillsboro.

Entz, Jacob John.....1895

Hutchinson.

Ardery, Lorimer.....1895

Lawrence.

Hamlin, James Alpheus 1895
Leis, George.....1869
Moore, John Thomas.....1888
Raymond, Harry Legate.....1891
Sayre, Lucius Elmer.....1883
Woodward, Brinton Webb 1895

Leavenworth.

Brown, Robert J. 1862
Mehl, Henry William 1892

Liberal, Seward Co.

Smith, George Sylvester 1892

Marion.

Young, Hiram W. 1894

Marysville.

Ault, Edward Abbott.....1895

Ottawa.

Becker, Charles Louis 1892

Peabody.

Roberts, Daniel John 1881

Topeka.

Merrell, Ashbele Hill.....1884
Washburn, Harry Monroe 1890

Wichita.

Hettinger, Howard Huyett.....1894

KENTUCKY.

Carrollton.

Geier, Oscar William.....1880

Covington.

Auf'mwasser, Hugo William 1892
Auf'mwasser, Julius Hermann 1893
Morwessel, Henry 1893
Pieck, Edward Ludwig 1887
Zwick, George Albert 1874

Flemingsburg.

Reynolds, John Jefferson.....1876

Frankfort.

Averill, William Henry 1874
Gayle, John William 1891

Henderson.

Radford, Reuben Lee 1893
McFarland, Robert Mumford.....1893

Louisville.

Beckmann, Oscar Albert.....1879
Colgan, John.....1867
Constantine, Edward Richard.....1891
Diehl, Conrad Lewis 1863
Dilly, Oscar Charles.....1888
Dimmitt, Addison 1895
Fowler, Joseph William.....1890
Jones, Simon Newton 1870
Mueller, Otto Edward 1888
Newman, George Abner 1866
Overstreet, William Payne 1893
Peter, Minor Cary 1894
Peyton, Robert Docker.....1887

Pfingst, Ferdinand John.....1867
Rademaker, Hermann Henry.....1879
Renz, Frederick Jacob.....1883
Rogers, Wiley.....1874
Scheffer, Emil.....1872
Schiemann, Edward Bernard.....1880
Schoettlin, Albert John.....1882
Snyder, Robert Johnson.....1887
Votteler, William.....1895

Newport.

Holzhauer, Gustavus.....1893

Shelbyville.

Preissler, Henry Webber.....1893

Somerset.

Porter, Chilton Scott.....1882

Uniontown.

Hardigg, William Leopold.....1881

LOUISIANA.

Baton Rouge.

Boisvert, Pierre.....1891

Bayou Goula.

Viallon, Paul Louis,.....1870

Bayou Sara.

Kilbourne, Lewis Perkins.....1891

Bonnet Carré.

Donaldson, Pierre Armand.....1891

Hammond.

Brewer, John Weems.....1893

Houma.

Fraisse, Louis Americus.....1891

Minden.

Goodwill.....1891

New Iberia.

Lee, Charles Hill.....1891
Lee, James Augustin.....1856

New Orleans.

Arny, Harry Vin.....1891
Breslin, Michael Thomas.....1891
Capdau, Pierre August.....1895
Chalin, Louis Fisk.....1887
Dejan, John Baptist George.....1891
Finlay, Alexander Kirkwood.....1883
Girling, Robert Nash.....1891
Godbold, Fabius Chapman.....1887
Grambois, Augustin.....1891
Graner, Albert.....1891
Graner, William.....1891
Hall, Charles Knap.....1887
Hubert, Ernest.....1891
Kaczoroski, Adolph Onesime.....1895
Keppler, Charles Lewis.....1891
Keppler, Christian Lewis.....1882
Lalmant, Eugene.....1891
Lavigne, Jean Baptist.....1891
Legendre, Joseph Amilcar.....1891
Levy, William Michael.....1894
Lyons, Isaac Luria.....1875
Mattingly, George James.....1891
May, Eugene.....1891
Metz, Abraham Lewis.....1887
Otto, John Nicholas Washington.....1891
Roux, Nemours Peter.....1895
Rudolf, Mrs. Eliza.....1887
Siekman, Ivan Francis.....1891
Stendel, Julius Guthardt.....1891
Taylor, Walter Thomas.....1891
Tuma, Bruno Ottokar Camillo.....1891
Wunderlich, Edward.....1891

Plaquemine.

Hiriart, Sebastian.....1891

Port Allen.

Charropin, Emile Lafond.....1891

St. Joseph.

Kershaw, John Pearis.....1895

MAINE.

Auburn.

Robinson, William Allen.....1892

Augusta.

Partridge, Charles Kimball.....1867
Partridge, Frank Reuben.....1895

Bangor.

Harlow, Noah Sparhawk.....1859
Sweet, Caldwell.....1881

Bath.

Anderson, Samuel.....1876

Belfast.

Moody, Richard Henry.....1876

Biddeford.

Boynton, Herschel.....1875

Danforth, Washington Co.

Porter, Martin Luther.....1892

Ellsworth.

Parcher, George Asa.....1875

Lewiston.

Moulton, Daniel Pierce.....1891

Machias.

Crane, Frank Trussel.....1894

Pittsfield.

Libby, Henry Fitzgerald.....1882

Portland.

Earl, Noble Clarkson.....1894
Frye, George Carlton.....1879
Hay, Edward Allston.....1889
Hay, Henry Homer.....1867
Perkins, Benjamin Abbott.....1878

South Windham.

Rand, Daniel Moulton.....1892

MARYLAND.

Baltimore.

Baxley, Jackson Brown.....1856
Brack, Charles Emil.....1876
Burrough, Horace.....1883
Caspari, Charles, Jr.....1883
Culbreth, David Marvel Reynolds....1883
Davis, John Alexander.....1894
Dohme, Alfred Robert Louis.....1891
Dohme, Charles Emile.....1863
Dohme, Louis.....1859
Elliott, Henry Alexander.....1859
Emich, Columbus Valentine.....1863
Fischer, Ewald Baldwin.....1895
Foster, James Webb.....1894
Frames, John Fuller.....1890
Gilpin, Henry Brooke.....1889
Gosman, Adam John.....1870
Habliston, Charles Carroll.....1894
Hancock, John Francis.....1863
Hancock, John Henry.....1870
Hynson, Henry Parr.....1890
Jennings, Nathaniel Hynson.....1857
Muth, George Louis.....1894
Nordmann, Herman.....1895
Quandt, Arthur Albert.....1894
Quandt, Ernest Edmond.....1894
Richardson, Thomas Leonard.....1895
Russell, Eugene James.....1856
Schulze, Louis.....1892
Sharp, Alpheus Phineas.....1855
Simon, William.....1885
Smith, Theodric.....1890
Thomsen, John Jacob.....1883
Vellines, Davies.....1895
Westcott, James Walling.....1890
WINKELMANN, JOHN HENRY.....1864

Chestertown.

Stam, Colin Ferguson.....1882

Cumberland.

Herman, John George.....1878
Shriver, Henry.....1876
Shryer, Thomas Wilson.....1875

Frederick City.

Schley, Steiner.....1878

Hagerstown.

WINTER, JONAS.....1863

Snow Hill.

Powell, William Cottingham.....1895

MASSACHUSETTS.

Andover.

Parker, George Hawkins.....1874

Boston.

Baird, Julian William.....1894
Bartlet, William Williams.....1875
Bassett, Charles Harrison.....1867
Boyden, Edward Cleveland.....1874
Burnham, Alfred Augustus, Jr.....1891
CANNING, HENRY.....1865
Capper, William Ernest.....1892
Chapin, William Arms.....1880
Colton, James Byers.....1865
Copeland, Sidney Fred.....1892
Cramer, Max.....1881
CUTLER, EDWARD WALDO.....1859
Doliber, Thomas.....1859
DRURY, LINUS DANA.....1871
Dunham, Henry Bristol.....1892
Durkee, William Carley.....1885
Gammon, Irving Parker.....1891
Godding, John Granville.....1875
Gorman, John Thomas Bernard.....1892
Hayes, James Henry.....1892
Jones, James Taber.....1875
Kelley, Edward Samuel.....1871

Leavitt, Miner La Harpe 1890
Lewis, Ernest Grant 1892
Lowd, John Colby 1871
Markoe, George Frederick Holmes ... 1863
McColgan, Adam Thomas 1892
Mowry, Albert Daniel 1884
Patch, Edgar Leonard 1872
Patten, Ichabod Bartlett 1858
Phillimore, Frederick George 1894
Pierce, William Herbert 1879
Prescott, Horace Augustus 1875
Sawyer, William Frederick 1885
Scoville, Wilbur Lincoln 1891
Sharples, Stephen Paschell 1875
SHEPPARD, SAMUEL AIRUS DARLINGTON. 1865
Siegemund, Charles Augustus 1882
Sleuman, Charles Andrew, Jr. 1892
Smith, Linville Holton 1892
Squires, George Brenton 1891
Stowell, Daniel 1875
Sumner, Alphonso 1892
Tilden, Amos Kendall 1892
Tucker, Greenleaf Robinson 1890
Vargas-Heredia, Jorge 1891
Varney, Edward Francis 1892
West, Charles Alfred 1892
Wheeler, William Dexter 1892
Williams, George Gorham 1888
Wilson, Benjamin Osgood 1859
Wood, Edward Stickney 1879

Brockton.

Randall, Frank Otis 1893

Brookfield.

Hobbs, William 1892

Brookline.

Wells, Edwin Herbert 1893

Cambridge.

Phillips, Carrie Elizabeth 1894

Cambridgeport.

BAYLEY, AUGUSTUS RAMSEY 1859
La Pierre, Elie Henry 1892
Laing, Alfred Allan 1888
Norton, George Edward 1895
ORNE, JOEL STONE 1859
Porter, Louis Fowler 1892

Charlestown.

Marshall, Ernest Clifton 1875
Stacey, Benjamin Franklin 1860

Chelsea.

Buck, John 1855
Buck, John Lynian 1883

Concord.

Richardson, Horatio Stillman 1892

East Weymouth.

Hoyt, George Melvin 1875

Fall River.

Riddell, Benjamin Franklin 1892

Fitchburg.

Estabrook, Henry Arthur 1886

Heydenville.

Cone, Alfred George 1892

Holyoke.

Ball, Charles Ely 1885
Benhard, Albert Henry 1894
Fortier, Lawrence Hubert 1892

Jamaica Plain.

Ernst, Frank Frederick 1891

Lawrence.

Glover, William Henry 1891
WHITNEY, HENRY MARTIN 1859

Lee.

Pease, Francis Merrick 1880

Lexington.

Perham, Henry Albert 1892

Lowell.

Bailey, Frederick 1869
Butler, Freeman Hall 1874
Hood, Charles Ira 1871
Robinson, Edward Augustus 1888
Thomasson, Anders 1892

Malden.

Sargent, Jesse Warren 1892

Marlborough.

Hartshorn, Frederick Arthur 1880

Methuen.

Taylor, George Arthur 1892

Milford.

Bridges, Charles Herbert 1892

New Bedford.

Blake, James Edwin 1866

Bunker, Elihu....1885
Lawton, Charles Henry....1873
Lawton, Horace Allen....1873
Shurtleff, Israel Hammond....1875
Taylor, John Pitman....1875

Newburyport.

Goodwin, William W.....1853
Homer, John....1887

Newton.

Crowdle, John Edward....1894
Hudson, Arthur....1882
Mason, Harry Ruggles....1894

North Andover.

Berrian, George Washington....1857

North Weymouth.

Turner, Thomas Larkin....1853

Orange.

Fish, Frederic Willis....1892

Peabody.

Grosvenor, Daniel Prescott....1881

Pittsfield.

Hydren, Carl....1892
Manning, John Henry....1889
Murphy, John Joseph....1892

Plymouth.

Carver, Frank Hahnemann....1891

Provincetown.

Adams, John Darrow....1892

Quincy.

Whall, Joseph Stokes....1873

Rockland.

Estes, Joseph Joslyn....1870

Rockport.

Blatchford, Eben....1857

Salem.

Nichols, Thomas Boyden....1876
Price, Charles Henry....1882
Price, Joseph....1888

Shelburne Falls.

Baker, Edwin....1875

Somerville.

Cowdin, George Henry....1875
Flanagan, Lewis Cass....1875
Howland, Edgar Joseph....1892

Stoneham.

Drake, Frederick Townsley....1894
Ward, Charles Abraham....1891

Taunton.

Kenney, Herbert Eastman....1890

Wellesley.

Tailby, Joseph Allen....1892

West Acton.

Hutchins, Isaiah....1880

Woburn.

Brooks, Frederick Pratt....1891
French, John Innes....1894

Worcester.

Hale, Chester Stanley....1892
Harris, Francis Mason....1894
Scott, George Theodore....1883
Williams, Duane Burnett....1881

MICHIGAN.

Ann Arbor.

Boyce, Samuel Robert....1894
Brown, Henry Jefferson....1882
Eberbach, Ottmar....1869
Mann, Albert....1889
Prescott, Albert Benjamin....1871
Schlotterbeck, Julius Otto....1888
Stevens, Alonzo Burdette....1885

Armada, Macombe Co.

Phillips, Edwin Freeman....1888

Benton Harbor.

Bird, Harry L....1891

Coopersville, Ottawa Co.

Gillett, John....1892

Corunna.

Reidy, Michael....1894

Detroit.

Bassett, Arthur....1888
Breningstall, Reuben Grant....1891
Caldwell, James William....1875
Dupont, William....1887
Gidday, Frederic Camdy....1893
Helfman, Joseph....1894
McFarland, Andrew....1891

Parker, Arthur Sheldon.....1891
Perry, Frederick William Riley.....1885
Sherrard, Charles Cornell 1893
Stearns, Henry Albyn 1888
Stevens, Fred. D 1888
Stewart, Francis Edward.....1894
Thompson, Frank Augustus 1888
Vernor, James.....1866
Warren, William Matthew.....1889

East Saginaw.

Prall, Delbert Elwyn 1876

Flushing.

Sprague, Wesson Gage.....1895

Gould City.

Summers, James Wilber Fisk.....1893

Grand Rapids.

Russell, Dorian Melancthon.....1894
Schrouder, Benjamin.....1895

Greenville.

Hall, William Alanson... 1888

Ionia.

Gundrum, George.....1882

Kalamazoo.

McDonald, George 1871
Todd, Albert May 1885

Manistee.

Lyman, Asahel Hubert 1884

Muskegon.

Brundage, Fred.....1888
Jesson, Jacob 1872

Owasso.

Parkhill, Stanley E.....1887

Red Jacket, Houghton Co.

McDonald, Daniel Turner 1884

St. Clair City.

Ward, George James.....1893

MINNESOTA.

Alexandria.

Holverson, Henry Theophilus 1895

Anoka.

Goodrich, George Herbert 1895

Austin.

Dorr, Edward Clark.....1895

Brainerd.

Percy, William Gil.....1892

Duluth.

Boyce, Samuel F.....1871
Sweeney, Robert Ormsby.....1866

Eyata.

Haggarty, Mary 1895

Faribault.

Hawley, William Bentley 1895

Fergus Falls.

Axness, Ole Mikkelson 1895

Grove City.

Gayner, John Niles 1890

Heron Lake.

Kellam, Charles Roderick Judson 1895

Lake Park.

Heyerdahl, Carl Otto.....1893

Minneapolis.

Crolius, Frank Marcelous 1884
Danek, John Francis.....1895
Donaldson, Joseph Coddington 1893
Griffin, Truman.....1895
Harrah, John William.....1895
Huhn, George.....1884
King, George Alexander Newton.....1892
Peterson, Johannes Otto 1895
Sanderson, Stephen Francis 1880
Thompson, Albert Delano 1895
Webster, Hendrick Gordon 1895
Wulling, Frederick John.....1893

New Ulm.

Eckstein, Andrew Joseph 1895

Owatonna.

Gausewitz, William John Frederick...1895
Netz, Richard Hermann Gustav 1895

Rochester.

Qvale, Victor Asbgörn.....1889

Spring Valley.

Rohde, Claus Frederich.....1885

St. Paul.

Faber, Frederick William 1895
Frost, William Arthur.....1892
Hall, Alden Taylor.....1895
Harding, Lawrence Arthur.....1892

Heller, Thomas Tomkins.....1895
Simmon, Karl.....1880
Warren, Edwin Alonzo.....1887
Zimmermann, Bernard.....1895

St. Louis Park.

Stiles, Justin Edson.....1895

Wabasha.

Trautmann, Ludwig.....1893

Wheaton.

Marks, Thomas Karl.....1895

MISSISSIPPI.

Aberdeen, Monroe Co.

Eckford, Joseph William.....1883

Jackson.

Ash, Matthew Franklin.....1856

Meridian.

Lillybeck, Oscar.....1891
Moore, Joshua Forrest.....1891
White, William Henry.....1891

Natchez.

Means, John Coalter.....1891

Port Gibson.

Shreve, John Alexander.....1880

Scranton.

Cox, William Augustus.....1894

MISSOURI.

Aux Vasse.

Craighead, Gordon Garrett.....1895

Boonville.

Mittelbach, William.....1891
Wooldridge, Daniel Turley.....1890

Carrollton.

Petit, Henry McEwen.....1860

Freeman.

Dolan, Frank Linley.....1888

Jackson.

Woods, Silas Elliott.....1893

Jefferson City.

Brandenberger, Adolph.....1894

Kansas City.

Breunert, Herman Otto.....1895
Corcoran, Charles Edward.....1895
Doerschuk, Albert Nathan.....1895
Eyssel, George.....1889
Hamilton, Claude Craig.....1893
Hess, Paul Ludwig.....1892
Lahme, Charles Adolph.....1881
Walker, David.....1894
Willett, Gerald Howard.....1892

Kirkwood.

Hemm, Louis Phillips.....1894
Mueller, Ambrose.....1894

Lebanon.

Farrar, Samuel Richard.....1891

Marcelin, Linn Co.

Shelton, William Armstrong.....1891

Marshall.

Franklin, Philip Henry.....1881

Mexico, Audrain Co.

Llewellyn, John Frederick.....1867

Mine La Motte.

Houser, Charles Gustavus.....1893

Moberly, Randolph Co.

Last, Louis Christopher August.....1888

Newhall.

Darrah, Andrew Jacksen.....1895

Old Orchard, St. Louis Co.

Geiger, Charles Frederick.....1894

Orrick, Ray Co.

McLean, George.....1894

Pierce City, Lawrence Co.

Armstrong, George Revington.....1877

Rich Hill.

Young, William.....1883

Sedalia.

Fleischmann, Augustus Theodore.....1885

St. Mary.

Lawbaugh, Emanuel Sylvester.....1895

St. Joseph.

Clark, James Ryland.....1895
Demond, Otto John..... 1892

St. Louis.

Alexander, Maurice William.....1871

Blank, Alois 1881
Boehm, Solomon 1871
Braun, Adolf Phillips Carl 1894
Curtman, Charles Otto 1871
Good, James Michener 1871
Grandjean, Charles 1871
Grandjean, Eugene 1871
Hassebrock, Henry Fred 1884
Hemm, Francis 1881
Hinrichs, Gustavus Detlef. 1895
Klie, George Henry Charles 1878
Layton, Thomas 1892
Leitch, Arthur 1860
Mallinckrodt, Edward 1869
MEYER, CHRISTIAN FRIED. GOTTLIEB . 1860
Morley, William Jarman 1876
Pauley, Frank Charles 1879
Physick, Henry Sanford 1870
SANDER, ENNO 1858
Scheffer, Henry William 1863
Schurk, Louis 1890
Sennewald, Ferdinand William 1865
Sohn, Frank 1888
Stark, Harry 1893
Tomfohrde, Charles William 1890
Uhlich, Ferdinand Gottlieb 1881
Vitt, Rudolph Simon 1895
Vordick, August Henry 1874
Wall, Otto Augustus 1884
Westmann, Frank Henry 1882
Whelpley, Henry Milton 1887
Whitcomb, Frederick Ezekiel 1888
Wilson, Charles Frederick 1891
Wurmb, Theodore Henry 1890

Stewartsville, De Kalb Co.

Weber, Hermann Augustus 1893

MONTANA.

Helena.

Starz, Emil Alfred 1895

NEBRASKA.

Beatrice.

Shultz, Merriken Emory 1893

Fairbury.

Pease, Autumn Vine 1893

Fremont.

Brunner, Charles Henry 1895

Grand Island, Hall Co.

Boyden, Henry D. 1893
Buchheit, Augustus William 1893

Lincoln.

Daubach, Charles Joseph 1889

Nebraska City.

Reed, James 1893

Omaha.

Kuhn, Norman Archibald 1878
Sherman, Charles Rollin 1889

Plattsmouth.

Gering, Henry Robert 1895

Randolph.

Townsend, Albert D. 1895

Wahoo.

St. Martin, Theophilus 1893

NEVADA.

Carson City.

Steinmetz, Frank Jacob 1895

Gold Hill.

Westlake, Leonard John 1895

Reno.

Hodgkinson, Samuel Jackson 1895
Pinniger, William 1895

Virginia City.

Cole, Allen M. 1895
Perkins, William Alexander 1869

Winnemucca.

Brown, William Ambrose 1893

NEW HAMPSHIRE.

Derry Depot.

Bell, Samuel Howard 1890

Dover.

McFarland, George Francis 1892
TUFTS, CHARLES AUGUSTUS 1856

Exeter.

Wetherell, Albert Sumner 1892

Great Falls.

Hurd, John Charles 1892

Hanover.

Downing, Lucien Bliss 1892

Lebanon.

Wilder, George Patterson 1892

Littleton.

Robins, Wilbur Fiske 1892

Manchester.

Baril, Joseph Benjamin 1892
Miville, Francis Charles 1877
Way, Frank Lester 1893

Marlborough.

Emerson, Hermann Lincoln 1892

Nashua.

Morse, Charles Milan 1888
Whitman, Nelson Samuel 1875

New Market.

Dearborn, George Luther 1853

Portsmouth.

Green, Benjamin 1888
Preston, Andrew Peabody 1881

Somersworth.

Moore, George 1859

NEW JERSEY.

Asbury Park.

Woolley, Stephen Disbrow 1888

Bayonne.

Alpers, William Charles 1890

Beverley.

Dougherty, Samuel Edward 1875

Bloomfield.

Scherff, John Philip 1877
Wood, George Mervin 1890

Bordentown.

Carslake, George Middleton 1880

Bridgeton.

Dare, Charles Ford 1889
Davis, Theodore Garrison 1890

Camden.

Beringer, George Mahlon 1893

East Orange.

Davis, George Randolph 1883
McIntyre, Byron Floyd 1876
Williams, Seward Whiting 1887

Elizabeth.

Frohwein, Richard 1867
Kent, Henry Avery, Jr. 1880
Oliver, William Murray 1875

Englewood.

Rockefeller, Lucius 1880

Freehold.

Walker, John Putnam 1881

Hoboken.

KLUSSMANN, HERMANN 1876

Jersey City.

Abernethy, Maxwell 1865
Beardmore, William Arthur 1890
Foulke, James 1881
Gallagher, John Charles 1893
Hartnett, Eugene 1893
Lyons, Fred. Wyckoff 1893
Vockroth, Emil 1893
White, George Henderson 1868
Wienges, Conrad 1875

Keyport.

Warn, William Edgar 1886

Madison.

Brown, William Thompson 1894

Matawan, Monmouth Co.

Slater, Frank Hovey 1882

Medford.

Thorn, Henry Prickett 1879

Morristown.

Carrell, Eugene Ayers 1875

Mt. Holly.

Jones, Edward Burrough 1894
WHITE, AARON SMITH 1860

Newark.

Betzler, Jacob 1880
Bruguier, Francis 1876
HOLZHAUER, CHARLES 1873
Joyce, Robert 1895
Mennen, Gerhard 1888
Sayre, William Henry 1877
Smith, Charles Bradley 1868
Smith, Clarence Pennington 1890
Staebler, Richard Elimar Johannes ... 1892
Stamford, William Harrison 1876
Van Winkle, Abraham 1871
Wright, Arthur Wellington 1894

New Brunswick.

Kilmer, Frederick Barnett 1886

Passaic.

Power, Frederick Belding 1872

Paterson.

Leonhard, Rudolph Ernest 1891

Perth Amboy.

Parisen, George Warren 1892

Plainfield.

Ollif, James Henry 1867
Reynolds, Howard Prescott 1875
Shaw, Robert Johnston 1875

Somerville.

Cook, Gilbert Snowden 1886
Field, James Clinton 1894

South Amboy.

JACQUES, GEORGE WASHINGTON 1869
Parisen, Allen Conrey 1895

NEW MEXICO.

Deming, Grant Co.

Kinnear, James Aloysius 1891

Hillsborough.

Nowers, Lawrence Edward 1892

Silver City.

Porterfield, William Clement 1895

NEW YORK.

Albany.

Gaus, Charles Henry 1879
Gaus, Louis Henry 1880
Gibson, Charles 1880
Huested, Alfred Birch 1879
Michaelis, Gustavus 1882
Sautter, Louis 1879
Turner, George Heather 1880
Walker, William John 1880

Binghamton.

Cox, John Thomas 1892
Loveland, Charles Hungerford 1892
Otis, Clark Zelotes 1886

Brooklyn.

Bartley, Elias Hudson 1893
Brooks, George Washington 1879
Brundage, Albert Harrison 1892
Colen, James Austin 1892
Cutts, Foxwell Curtiss, Jr 1875
Davis, William Mortimer 1879
DeForest, William Pendleton 1879
Dennin, Charles 1875
Dennin, Edwin Clinton 1892
Douglass, Henry, Jr 1875
Dunn, John Augustus 1867
Eccles, Robert Gibson 1885
FOUGÉRA, EDMUND CHARLES HENRY 1890
Haviland, Henry 1857
Krieger, Philip 1876
Lehn, Louis 1874
Levy, Adolph 1877
Livingston, Barent Van Buren 1872
McElhenie, Thomas Diamond 1872
Newman, George Anthony 1865
Owens, Richard John 1860
Pfeiffer, John 1893
Ray, Peter William 1892
Schimpf, Henry William 1894
Snyder, Ambrose Chancellor 1867
Squibb, Edward Hamilton 1882
Squibb, Edward Robinson 1858
Werner, Rudolph Carl 1892
Zellhoefer, George 1876

Buffalo.

Gregory, Willis George 1886
Hayes, Horace Phillips 1880
Peabody, William Huntington 1857
Rano, Charles Orlando 1866

Catskill.

Du Bois, William Laneman 1880

Corning.

Cole, Victor Le Roy 1890

Croton-on-Hudson.

Henry, Charles (Dworniczak) 1881

Dunkirk.

Davis, Eugene Miller 1892

Elmira.

Holmes, Clay Wood 1873

Fillmore, Alleghany Co.

Ridgway, Lemuel Augustus 1882

Fishkill-on-Hudson.

Moith, Augustus Theodore 1860

Flushing.

Hepburn, John 1873
James, William Tefft 1882

Genesco, Livingston Co.

Rogers, Arthur Henry 1882

Gloversville, Fulton Co.

Miller, Jason Albert 1879
Van Auken, Jerrie A 1880

Groton.

Rhodes, Charles Orman 1895

Holley, Orleans Co.

Bishop, Francis Myron 1882

Jamaica, Queens Co.

Baylis, Lewis Fosdick 1880
Goodale, Harvey Galusha 1879
Peck, George Lyman 1883

Jamestown.

Winnberg, John Magnus 1892

Kingston.

Dedrick, William Frederick 1884

Middletown.

KING, JAMES THEODORE 1859
Rogers, William Henry 1869

Mount Vernon.

Gill, George 1872

Newburgh.

Chapman, Isaac Close 1887

New York City.

Allison, William Outis 1895
Amend, Bernard Gottwald 1892
Amend, Otto Paul 1892
Atwood, Herman White 1873
Balser, Gustavus 1875
Bendiner, Samuel Julius 1882
Billings, Henry Merry 1869
Blackman, Augustus Smith 1893
Chandler, Charles Frederic 1867
Christie, James 1893
Coblentz, Virgil 1882
Cook, Thomas Penrose 1877
Ditman, Andrew Jackson 1868
Elliott, Arthur Henry 1892
Ewing, John 1893
Fairchild, Benjamin Thomas 1875
Fairchild, Samuel William 1887
Fink, Frederick William 1886
Fraser, Horatio Nelson 1888
Gane, Eustace Harold 1895
Gardner, Robert Winslow 1867
Geisler, Joseph Frank 1889
GRIFFITH, ALBERT RICHARD 1870
Hauenstein, William 1883
Haynes, David Oliphant 1887
Hays, Joseph Anthony 1892
Heydenreich, Emile 1867
Higgins, James Starkey 1862
Hoffmann, Frederick 1867
Hudnut, Alexander 1857
Jelliffe, Smith Ely 1895
Jewell, Walter Hart 1895
Jones, James Henry 1892
Jungmann, Julius 1879
Kalish, Julius 1875
Keenan, Thomas John 1894
Kemp, Edward 1868
Kennedy, Ezra Joseph 1887
Koles, Samuel Morse 1890
Kraemer, Henry 1892
Lampa, Robert Raymond 1892
Loelkes, Alexander George 1891
Lovis, Henry Christian 1892
Main, Thomas Francis 1872
Mason, Alfred Henry 1884
Massey, William Morton 1885
Mayo, Caswell Armstrong 1893
McIntyre, Ewen 1873
McKesson, George Clinton 1888
McKesson, John, Jr. 1867
MILHAU, EDWARD LEON 1858
Molwitz, Ernest 1867
O'Neil, Henry Maurice 1879
Osmun, Charles Alvin 1868
Plaut, Albert 1894
Pleasants, Charles Henry 1890
Plummer, Edward 1889
Pyle, Cyrus 1859
Quackinbush, Benjamin Franklin 1886
Ramsperger, Gustavus 1860
Rice, Charles 1870
Runyon, Edward Wheelock 1875
Rusby, Henry Hurd 1890
Sayre, Edward Augustus 1877
Schieffelin, William Jay 1892
Schmid, Henry 1887
Schmidt, Ferdinand Traugott 1886
SEABURY, GEORGE JOHN 1876
Sieker, Ferdinand August 1893

Skelly, James Joseph....1866
Smith, Reuben Randolph....1890
Stoff, Louis Ferdinand....1892
Tscheppe, Adolph....1876
Weinmann, Oscar Christian....1873
Wichelns, Frederick....1881
Wickham, William Hull....1870
Wilson, William....1876

Olean.

Coon, James Van Deventer....1880
Rich, Willis Simmons....1882

Oswego.

Butler, Charles Henry....1887

Plattsburgh.

Hitchcock, John T....1892

Port Chester.

Hyler, William Henry....1875

Port Henry.

Smith, Edward Salvister....1890

Potsdam.

Thatcher, Hervey Dexter....1865

Richfield Springs.

Smith, Willard Alfred....1880

Rochester.

Paine, James Dixon....1857
Schmitt, Joseph Max....1882

Rome.

Owens, James Alanson....1882

Saratoga Springs.

Fish, Charles Frederick....1866

Syracuse.

Dawson, Edward Seymour, Jr....1876
Snow, Charles Wesley....1876
Webber, Joseph Le Roy....1886

Tonawanda, Erie Co.

Scoville, Charles Henry....1882

Troy.

Pennington, Thomas Henry Sands....1877

Utica.

Blaikie, William....1879
Cone, John Wright....1876
Maine, August....1892

Wellsville, Allegheny Co.

Hall, Edwin Bradford....1879

Yonkers.

Eschman, Frederick William Rudolph.1880
Petsche, Franz Fred. Bismark Wilhelm.1892
Wray, George Brown....1888

NORTH CAROLINA.

Asheville.

Smith, Whitefoord Gamewell....1892

Charlotte.

Wearn, William Henry....1888

Concord.

Fetzer, Nevin Dieffenbacher....1894
Johnson, Daniel Dudley....1894

Durham, Orange Co.

Vaughan, Parry Wyche....1882
Yearby, William Morgan....1894

Fayetteville.

Horne, Henry Ruffin....1891
Sedberry, Bond English....1882

Franklin, Macon Co.

Smith, Frank Taylor....1894

Grangeville.

Lisle, Justin Dickson....1894

Greensboro.

Mebane, Robert Sloan....1894

Henderson.

Parker, Walter Wellington....1894

Hickory.

Royster, Oliver Marcus....1894

Littleton.

Parrott, John Evans....1890

Maxton.

Croom, James Dallas....1890

Oxford.

Hancock, Franklin Willis....1888

Plymouth.

Chears, Henry Randolph....1893

Raleigh.

Bobbitt, James Henry....1894
Bradley, Augustus....1894
Hunter, Buxton Williams....1891
MacRae, John Young....1894
Simpson, William....1873

Tarboro.

Zoeller, Edward Victor 1878

Washington.

Gallagher, Charles Kewell 1857

Waynesville.

Way, David 1894

Wilmington.

Hardin, John Haywood 1881

Wilson.

Hargrave, Benjamin Worthington 1894

NORTH DAKOTA.

Grafton.

Haussamen, Henry Louis 1888

Jamestown.

Davison, James 1895

Lisbon.

Parker, William Stillmann 1895

OHIO.

Akron.

Smith, Joseph Stahle 1878

Berea, Cuyahoga Co.

Noble, William Wesley 1893

Brooklyn Village.

Schmidt, Carl 1891

Bryan.

Snyder, Alva Leach 1873

Caldwell.

Bowron, Walter Henry 1890

Cambridge.

Ogier, John Morrison 1895

Cheviot.

Hildreth, Newton Gough 1879

Chillicothe.

Howson, Arthur Bayshawe 1886
Nipgen, John Alvin 1879

Cincinnati.

Betz, Otto Edward 1887
De Lang, Alfred 1887
Eger, George 1864
Eichberg, Julius Henry 1893
Fennel, Charles Theodore Piderit 1886
Fieber, Gustavus Adolphus 1893
Gordon, William John Maclester 1854
Greve, Theodore Lund August 1864
Greyer, Julius 1880
Heineman, Otto 1864
Hoffman, Julius 1887
Klayer, Louis 1884
Koehnken, Herman Henry 1875
Lehnkering, Charles Frederick 1893
Lloyd, John Uri 1870
Meininger, Albert 1881
Merrell, Charles George 1888
Merrell, George 1879
Phillips, Charles Wilson 1881
Ruppert, John 1880
Sauer, Louis Wendlin 1882
Serodino, Herman 1880
Simonson, William 1887
Vilter, Hermann Theodore 1881
Wagner, Henry 1876
Weeks, Benjamin Franklin 1891
Wetterstroem, Albert Frederick Charles. 1888
YORKSTON, MATTHEW MACKAY 1864
Zuenkeler, John Ferdinand 1887

Cleveland.

Acker, Philip 1889
Asplin, John Harding 1882
Aubley, Samuel 1888
Bartlett, John Augustus 1893
Bechberger, Henry 1893
Benfield, Charles William 1893
Biddle, Herbert George 1888
Bruce, James 1882
Cobb, Ralph Lathrop 1883
Deutsch, Julius William 1888
Dreher, Louis 1881
Elliott, Sidney Thomas 1893
Feil, Joseph 1885
Flood, William Henry 1892
Gegelein, Frederick Leonhardt 1881
Gleim, John Christopher 1893
Haake, William Henry 1893
Hannan, Owen Burdette 1893
Hechler, George Louis 1882
Hopp, Lewis Christopher 1876
Kiefer, George 1890
Kuder, William Frank 1893
Lane, Edward Baxter 1893
Lehr, Philip 1885
May, Arthur Ferdinand 1881

Meyer, William Victor....1893
Myers, Daniel....1882
Probeck, George Joseph....1893
Rosewater, Nathan....1880
Schellentrager, Ernst August....1882
Schoenhut, Christian Henry....1888
Selzer, Eugene Reinhold....1893
Sherwood, Henry Jackson....1894
Sords, Thomas Vincent....1893
Spenzer, Peter Ignatius....1872
Stecher, Henry William....1895
Urban, Jacob Philip....1881
Voss, George William....1885

Columbiana.

Ink, Charles Elliott....1885

Columbus.

Bruck, Philip Henry....1884
Byrne, John....1894
Hatton, Edgar Melville....1878
Hatton, Ellmore Wright....1894
Herbst, Frederick William....1882
Huston, Charles....1872
Karb, George James....1883
Kauffman, George Beecher....1882
Rauschkolb, John....1894
Schueller, Ernst....1881
Schueller, Frederick William....1880
Sherwood, Louis Walker....1882

Conneaut, Ashtabula Co.

Simons, Arthur Henry....1892

Dayton.

Burkhardt, Mark Anthony....1887
Kurfurst, Henry Ferdinand....1881
Spengler, John George....1887

Delaware.

Pfiffner, Fritz John R....1894

East Liverpool, Colorado Co.

Albright, Emmet Cyrus....1894

Findlay.

Firmin, John Curtis....1893

Glendale, Hamilton Co.

Feemster, Joseph Hall....1873

Grand Rapids, Wood Co.

Thurston, Azor....1886

Ironton.

Sample, Elmer Winters....1894
Winters, Aaron....1894

Jefferson, Ashtabula Co.

Case, Charles Henry....1892

Lima.

Melville, William Milne....1893

Logan.

Harrington, Frank....1869

Massillon, Stark Co.

Baltzly, Zachariah Taylor....1876
Kirchhofer, Peter Paul....1881

Middletown.

Johnson, Charles Brayton....1876

Navarre.

Grossklaus, John Ferdinand....1859

Norwood, Hamilton Co.

Weyer, John....1887

Salem, Columbiana Co.

Hawkins, Michael Smith....1870

Scio.

Beal, James Hartley....1892

Springfield.

Casper, Thomas Jefferson....1867
Siegenthaler, Harvey N....1882

Toledo.

Hohly, Charles....1872

Troy.

Tobey, Charles William....1879

Wooster.

Ohliger, Lewis Philip....1871

OKLAHOMA TERRITORY.

El Reno.

Sombart, John Edward....1881

OREGON.

Ashland.

Sherwin, Eugene Alonzo....1889

Portland.

Blumauer, Louis....1889
Clarke, Louis Gaylord....1889
Dietrick, Howard Dickson....1889
Pfunder, William....1889

The Dalles.

Blakeley, George Clarence.....1892

PENNSYLVANIA.

Allegheny City.

Eggers, Frederick Hermann.....1872
Slocum, Frank Leroy.....1880

Beaver, Beaver Co.

Andriessen, Hugo.....1875

Bristol.

Pursell, Howard.....1880
Young, John Kreesen.....1887

Carlisle.

Horn, Wilbur Fisk.....1876

Chambersburg.

Crawford, Walter Beatty, Jr.....1891
Keefer, Charles DeWalt.....1891

Coatesville.

Kenworthy, John.....1895

Connellsville.

Berryhill, Henry Pennick.....1890

Franklin.

Rieseman, Joseph.....1883

Harrisburg.

George, Charles Theodore.....1873
Gorgas, George Albert.....1884
Gross, Edward Ziegler.....1883
Miller, Jacob Augustus.....1873

Honesdale.

Leine, Arthur Moritz.....1895

Lancaster.

Heinitsh, Charles Augustus.....1857
Heinitsh, Sigmund William.....1889

Lebanon.

Lemberger, Joseph Lyon.....1858
Redsecker, Jacob Henry.....1881

Linesville.

Allen, E. Floyd.....1885

Lock Haven.

Prieson, Adolph.....1880

Minersville.

Burns, John Kellar.....1876

Mt. Pleasant, Westmoreland Co.

McElwee, Emer Judson.....1888

Norristown.

Reed, Willoughby Henry.....1893
Stahler, William.....1880

Orwigsburg, Schuylkill Co.

Binkley, George K.....1892

Philadelphia.

Bastin, Edson Sewell.....1895
Bauer, Louis Gustavus.....1867
Blair, Henry Cowen.....1868
Borell, Henry Augustus.....1874
Boring, Edwin McCurdy.....1867
Bower, Henry.....1860
Bullock, Charles.....1857
Burg, John Dellinger.....1888
Cuthbert, Richard William.....1893
De Graffe, Bertha Leon.....1895
Dobbins, Edwards Tompkins.....1867
Eberle, Charles Louis.....1865
Eddy, Henry Clay.....1869
Ellis, Evan Tyson.....1857
England, Joseph Winters.....1893
Fox, Peter Paul.....1869
French, Harry Banks.....1890
Gano, William Hubbell.....1892
Gerhard, Samuel.....1873
Grahame, Israel Janney.....1856
Hance, Edward Hance.....1857
Hancock, Charles West.....1868
Hassinger, Samuel Ellphat Reed.....1880
Haussmann, Frederick William.....1895
Heintzelman, Joseph Augustus.....1858
Holland, George.....1894
Hunter, Henry Blount.....1894
Jenks, William Jenks.....1858
Jones, Alexander Henry.....1874
Kebler, Lyman Frederic.....1894
Keeney, Caleb Reynolds.....1868
Kline, Mahlon Norwood.....1878
Koch, Louis.....1872
Krewson, William Egbert.....1875
Lowe, Clement Belton.....1895
Maisch, Henry Charles Christian.....1885
Marshall, Rush Porter.....1893
McIntyre, William.....1868
Mellor, Alfred.....1864
Miller, Adolph William.....1868
Milligan, Decatur.....1867
Moore, Joachim Bonaparte.....1860

Morrison, John Louis Dales.....1895
Morris, Lemuel Iorwerth.....1880
Newbold, Thomas Mitchell.....1876
Ogden, John.....1890
Ottinger, James Jeremiah.....1876
Peacock, Josiah Comegys.....1892
Perot, Thomas Morris.....1857
Pile, Gustavus.....1881
Potts, David Gardiner.....1893
Preston, David.....1868
Procter, Wallace.....1874
REMINGTON, JOSEPH PRICE.....1867
Richter, Gustave Adolph.....1890
Riley, Charles William.....1868
Rittenhouse, Henry Norman.....1857
Robbins, Alonzo.....1865
ROSENGARTEN, MITCHELL GEORGE...1869
Ryan, Frank Gibbs.....1892
Sadtler, Samuel Philip.....1893
Shafer, Erwin Clement.....1893
Shinn, James Thornton.....1860
Shoemaker, Richard Martin.....1869
Stedem, Frederick Will. Edward.....1892
Taylor, Alfred Bower.....1852
Thompson, William Beatty.....1858
Trimble, Henry.....1876
Warner, William Richard.....1857
Webb, William Henry.....1867
Weidemann, Charles Alexander.....1868
Wendell, Henry Edward.....1873
Wiegand, Thomas Snowdon.....1857
ZEILIN, JOHN HENRY.....1859

Pittsburgh.

Emanuel, Louis.....1878
Finley, Ardon Chapman.....1890
Henderson, Archibald Keys.....1888
Holland, Samuel Smith.....1876
Kelly, George Armstrong.....1882
Koch, Julius Arnold.....1892
Nisbet, William Washington.....1883

Pottsville.

Deibert, Thomas Irvin.....1882
Kennedy, George Washington.....1869

Reading.

Stein, Jacob Henry.....1869
Ziegler, Philip Milton.....1867

Schuylkill Haven.

Commings, Charles Samuel.....1888

Scottdale, Westmoreland Co.

McNeil, John Murray.....1882

Shamokin.

Smink, Robert William.....1893
Smink, William Henry R.....1885

Towanda.

Porter, Henry Carroll.....1880

Warren.

Dixson, Frederick Hartly.....1892

West Chester.

Evans, Joseph Spragg.....1877

White Haven.

Driggs, Charles M.....1881

Williamsport.

Cornell, Edward Augustus.....1873
Duble, Jesse Balderston.....1870
Hill, Justin Luther.....1887

York.

Patton, John Franklin.....1880

RHODE ISLAND.

Narragonsett Pier.

Tobin, John Martin.....1887

Newport.

Cole, Charles Mowry.....1888
Cotton, William Henry.....1885
Downing, Benjamin Franklin.....1886
Huntington, William Hunter.....1891

Providence.

Blanding, William Oliver.....1894
Calder, Albert Layton.....1859
Cates, William Everett.....1888
Danforth, Edmund Culver.....1878
Fenner, Alexander Wilson.....1888
Gilbert, Charles Atwood.....1891
Greene, William Ray.....1883
Hardy, Cyrus Daniel.....1891
O'Hare, James.....1888
Pearce, Howard Anthony.....1894
Potter, William Robert.....1894
Reynolds, William Keyes.....1876
Wood, Mason Bowen.....1882

Westerly.

Collins, Albert Burlingame.....1882

SOUTH CAROLINA.

Anderson.

Wilhite, Frank Turner.....1893

Charleston.

Aimar, Charles Pons.....1879
Burnham, Edward Steinmeyer.....1874
Eckel, Augustus William.....1874
Marsteller, George Ludwig.....1883
Plenge, Henry Charles.....1894

Columbia.

Thomas, Oscar Ernest.....1882

SOUTH DAKOTA.

Eureka.

Tammen, George.....1895

Howard.

Ayer, Charles Foster.....1891

Lake Preston, Kingsbury Co.

Keith, Irwin Alonzo.....1892

Tyndall.

Cotton, Robert M.....1893

Watertown.

Jones, David Franklin.....1895

Wessington Springs.

Hall, Nettie Crabbe.....1893

Yankton.

Brecht, Frederick Adolph.....1895

TENNESSEE.

Bristol.

Bunting, Lindsay.....1890

Chattanooga.

Greve, Charles Mathias.....1887
Stong, Franz Sigel.....1894
Voigt, Joseph Frederick.....1893

Clarksville.

Bradley, Charles Larkin.....1894
Lockert, Charles Lacy.....1894

Columbia.

Rains, Aris Brown.....1894

Covington.

Jacocks, John Thomas.....1894

Harriman.

Kline, Charles Grant.....1894

Knoxville.

Gooding, Charles John.....1892
Rosenthal, David Abraham.....1894

Memphis.

Robinson, James Scott.....1869
Treherne, John Curtis.....1894

Murfreesboro.

Vickers, Rufus William.....1894

Nashville.

Burge, James Oscar.....1878
Davis, Samuel Charles.....1893
McGill, John Thomas.....1895
Ruddiman, Edsel Alexander.....1894

Tullahoma.

Conger, Iliff.....1891

TEXAS.

Athens.

La Rue, William Isaac.....1892

Dallas.

De Lorenzi, Albert.....1890
Keene, Thomas Rucker.....1888
Klauber, Charles Nathaniel.....1891
Schweickhardt, Richard.....1890

Denison.

Robert, William Henry, Jr.....1892

El Paso.

Irvin, William Armstrong.....1879

Ennis.

Matkin, George Garrett.....1892

Fort Worth.

Harper, Harry Winston.....1881

Galveston.

Orton, Ingomar Francois.....1891

Granbury, Hood Co.

Morgan, Eugene Hilliard.....1892

Houston.

Burgheim, Jacob.....1892
Cunningham, Henrietta Manlove.....1894

Paris.

Greiner, William Edward.....1892

Rockwall.

Vance, James Walter.....1895

San Antonio.

Cohn, Richard 1892
Schmitt, George Joseph Francis.....1890

Taylor.

Thames, Joseph Jefferson 1895

Tyler.

Gee, Charlie 1893

Van Alstyne.

Neathery, James Miller 1892

UTAH.

Park City.

Brother, William 1892

Salt Lake City.

Druehl, Frank August 1889
Farlow, John Boylan 1889
Franken, James Latinnes 1892
Hill, Frederick John 1895
McCoy, Clarence Herbert.....1893

VERMONT.

Brandon.

Crossman, George Alvin 1872

Rutland.

Higgins, Albert Warren 1895

St. Albans.

Dutcher, Alfred Luther 1892

St. Johnsbury.

Bingham, Charles Calvin.....1875

VIRGINIA.

Charlottesville.

Wills, Frederick Miles.....1890

Danville.

Cole, Howson White.....1882

Falls Church.

Church, Merton Elbridge 1892

Leesburg.

Purcell, Nicholas Sidney 1890

Norfolk.

Hudgins, Ernest Franklin.....1893

Richmond.

Baker, Thomas Roberts 1873
Briggs, Andrew Gessner 1890
Harrison, Richard Heth Munford....1894
Miller, Polk.....1894
Miller, Turner Ashby.....1894
Scott, William Henry 1873

Roanoke.

Christian, John Fleming 1894

WASHINGTON.

Castle Rock.

Hille, David Johnson 1893

La Connor, Skagit Co.

Joergensen,Gerhard Johan Carl Sophus.1889

Palouse.

Mason, George L.....1895

Seattle.

Holmes, Henry Elliott.....1880

Tacoma.

Cummings, Henry Thornton.....1853

WEST VIRGINIA.

Charleston, Kanawha Co.

Boggs, Edwin Leslie 1872

Wheeling.

Williams, William Hudson.....1880

WISCONSIN.

Black River Falls.

Werner, Benjamin Charlie 1895

Eau Claire.

Blestren, Hans Markus Gunerius.....1889

Fountain City.

Bechman, Charles Richard 1882

La Crosse.

Beyschlag, Charles.....1880

Madison.

Bernhard, Charles Henry.....1888
Hollister, Albert Henry.....1884
Kremers, Edward.....1887

Mayville, Dodge Co.

Sauerhering, Rudolph Aurelius 1884

Milwaukee.

Conrath, Adam 1881
Drake, John Ransom 1860
Kienth, Hans 1884
Ruenzel, Henry Gottlieb 1892
Schrank, Charles Henry 1876
Upson, Rosa 1887

Neillsville.

Sniteman, Charles Clarence 1881

WYOMING.

Cheyenne.

Woods, George Dana 1895

Rawlins.

Stuver, Emanuel 1895

Rock Springs.

Daus, Leopold Louis 1895

BERMUDA.

Hamilton.

Heyl, James Bell 1863

DOMINION OF CANADA.

NEW BRUNSWICK.

St. John.

Coupe, Robert Edward 1894

NORTHWESTERN TERRITORY.

Regina.

Ferguson, Andrew Davis 1893

NOVA SCOTIA.

Halifax.

Simson, Francis Cook 1876
Simson, William Amore 1894

Pictou.

Fraser, Robert Peden 1885

ONTARIO.

Hamilton.

Clark, John Alexander 1890

Ottawa.

Saunders, William 1860

St. Thomas.

Foster, William Orrville 1881

Stratford.

Waugh, George James 1862

Toronto.

Fleet, Frederick William 1895
Heebner, Charles Frederick 1894
Holgate, Francis Heasell 1895
Lander, John Cambridge 1877
Lowden, John 1875
Robinson, Ernest Frankish 1889

Windsor.

D'Avignon, John Eugene 1888

PRINCE EDWARD ISLAND.

Charlottetown.

Dodd, Simon Walker 1884

QUEBEC.

Montreal.

Baridon, Louis Richard 1890
Carrieré, Rodrique 1893
Chapman, William Henry 1895
Décary, Louis Arthur 1895
Gray, Henry Robert 1867
Hedley, Thomas Albert 1893
Lachance, Seraphin 1888
Lanctot, Henri Raymond 1894
Morland, Robert Lawson 1892
Morrison, Joseph Edward 1888
Muir, Ebenezer 1895

Three Rivers.

Williams, Richard Wellington 1883

HAWAIIAN ISLANDS.

Honolulu.

Lyons, Albert Byron 1885

MEXICO.

Monterey.

Egeling, Berthold Frederick Gustavus 1893

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Hoffmann, Frederick 1867
Martin, Nicholas Henry, Newcastle upon Tyne, England 1891
WELLCOME, HENRY SOLOMON, London, England 1875

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Fougue, Joseph 1893
Herring, Herbert L 1893
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Doerschuk, Albert N.,
1201 Grand ave., Kansas City, Mo.
Dohme, Alfred R. L.,
Pratt & Howard sts., Baltimore, Md.
Dohme, Charles E.,
Pratt & Howard sts., Baltimore, Md.
Dohme, Louis,
Pratt & Howard sts., Baltimore, Md.
Dolan, Frank L.,
Freeman, Cass. co., Mo.
Doliber, Thomas,
Atlantic ave. & India st., Boston, Mass.
Donaldson, Joseph C.,
1605 Chicago ave., Minneapolis, Minn.
Donaldson, Pierre A.,
Bonnet Carré, La.
Dorner, Emil A.,
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Dorr, Edward C.,
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Dougherty, Samuel E.,
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Douglass, Henry, Jr.,
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Dowdy, Joseph F.,
204 Main st., Little Rock, Ark.
Downing, Benjamin F.,
42 Broadway, Newport, R. I.
Downing, Lucien B.,
Hanover, N. H.
Drake, Frederick T.,
9 Washington st., Stoneham, Mass.
Drake, John R.,
365 East Water st., Milwaukee, Wis.
Dreher, Louis,
302 Euclid ave., Cleveland, O.
Dresser, George E.,
Main st., Putnam, Conn.
Driggs, Charles M.,
Railroad & Berwick sts., White Haven, Pa.
Druehl, Frank A.,
Main & 3d South sts., Salt Lake City, Utah.
Drury, John S.,
Chester ave., Bakersfield, Kern co., Cal.
Drury, Linus D.,
Warren & Dudley sts., Boston, Mass.
Duble, Jesse B.,
Pine & 4th sts., Williamsport, Pa.
Du Bois, William L.,
281 Main st., Catskill, N. Y.
Duckett, Walter G.,
22d st. & Penna ave., Washington, D. C.
Duggan, James,
50 Main st., Norwich, Conn.

Dunham, Henry B.,
12 Copeland st., Boston, Mass.
Dunn, John A.,
36 Doughty st., Brooklyn, N. Y.
Dunwody, Richard G.,
369 Piedmont ave., Atlanta, Ga.
Dupont, William,
182 Michigan ave., Detroit, Mich.
Dupuy, Eugene,
417 Decatur st., Brooklyn, N. Y.
Durban, Sebastian C.,
708 Broad st., Augusta, Ga.
Durkee, William C.,
392 Boylston st., Boston, Mass.
Dutcher, Alfred L.,
109 Main st., St. Albans, Vt.
Eads, Robert I.,
100 E. New York st., Indianapolis, Ind.
Eagny, James T.,
126 Grand ave., New Haven, Conn.
Earl, Noble C.,
Portland, Me.
Easterday, Herbert C.,
700 New Jersey ave. N.W., Washington, D. C.
Eberbach, Ottmar,
12 South Main st., Ann Arbor, Mich.
Eberle, Charles L.,
4779 Germantown ave., Philadelphia, Pa.
EBERT, ALBERT E.,
426 State st., Chicago, Ill.
Eccles, Robert G.,
191 Dean st., Brooklyn, N. Y.
Eckel, Augustus W.,
231 King st., Charleston, S. C.
Eckford, Joseph Wm.,
Commerce st., Aberdeen, Miss.
Eckstein, Andrew J.,
125 N. Minnesota st., New Ulm, Minn.
Eddy, Henry C.,
18th & Lombard sts., Philadelphia, Pa.
Edwards, Frederick B.,
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Edwards, Nathan W.,
Main st., Fairmount, Ind.
Egeling, B. F. Gustavus,
Botica del Leon, Monterey, Mexico.
Eger, George,
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Eggers, Frederick H.,
172 E. Ohio st., Allegheny City, Pa.
Ehrlicher, Henry M.,
334 Court st., Pekin, Ill.
Eichberg, Julius H.,
50 W. 9th st., Cincinnati, O.
Eichrodt, Charles W.,
503 North West st., Indianapolis, Ind.
Ekman, N. Adolf,
Oroville, Cal.
Elbe, Constantine B.,
Long Beach, Los Angeles Co., Cal.
Eliel, Leo,
101 Main st., South Bend, Ind.
Elliott, Arthur H.,
115 West 68th st., New York, N. Y.
Elliott, Henry A.,
673 W. Lexington st., Baltimore, Md.
Elliott, Sidney T.,
32 John st., Cleveland, O.
Ellis, Evan T.,
335 S. 18th st., Philadelphia, Pa.
Emanuel, Louis,
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Emerson, Hermann L.,
Marlborough, N. H.
Emich, Columbus V.,
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England, Joseph W.,
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Entz, Jacob J.,
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Ewing, John,
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Fairchild, Samuel W.,
84 Fulton st., New York, N. Y.
Farlow, John B.,
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Farrar, Samuel R.,
Opera House Block, Lebanon, Mo.
Fay, Hamilton,
Pacific ave., Santa Cruz, Cal.
Feemster, Joseph H.,
Glendale, Hamilton co., O.
Feil, Joseph,
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Feldkamp, Chas. L.,
1127 N. Clark st., Chicago, Ill.
Fennel, Charles T. P.,
8th & Vine sts., Cincinnati, O.
Fenner, Alexander W.,
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Ferguson, Andrew D.,
Scarth st., Regina, N. W. T.
Fetzer, Nevin D.,
Concord, N. C.
Fieber, Gustavus A.,
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Field, Claud,
318 E. St. Clair st., Indianapolis, Ind.
Field, James C.,
38 W. Main st., Somerville, N. J.
Fink, Frederick Wm.,
128 William st., New York, N. Y.
Finlay, Alexander K.,
186 Camp st., New Orleans, La.
Finley, Ardon C.,
Dairy ave., Pittsburgh, E. E., Pa.
Firmin, John C.,
319 S. Main st., Findlay, Hancock Co., O.
Fischer, E. Baldwin,
Fayette & Ann sts., Baltimore, Md.
Fischer, Oscar F.,
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Fish, Chas. F.,
348 Broadway, Saratoga Springs, N. Y.
Fish, Frederic W.,
Orange, Mass.
Fisher, Elbert E.,
144 Park ave., Bridgeport, Conn.
Fisher, George W.,
De Land, Fla.
Flanagan, Lewis C.,
589 Somerville ave., Somerville, Mass.
Fleischer, Adolph T.,
296 N. Market st., Chicago, Ill.
Fleischmann, Augustus T.,
4th & Ohio sts., Sedalia, Mo.
Flemer, Lewis,
1418 14th st. N. W., Washington, D. C.
Flett, Frederick W.,
502 W. Queen st., Toronto, Can.
Fletcher, John W.,
Main st., Batesville, Ark.
Flint, George B.,
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Flint, John H.,
Marysville, Yuba Co., Cal.
Flood, William H.,
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Ford, Charles M.,
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Forsyth, William K.,
3100 State st., Chicago, Ill.
Fortier, Lawrence H.,
372 High st., Holyoke, Mass.
Foster, J. Webb,
637 Hanover st., Baltimore, Md.
Foster, William O.,
221 Talbot st., St. Thomas, Ontario, Can.
Fougera, Edmond C. H.,
309 8th st., Brooklyn, N. Y.
Foulke, James,
107 Monticello ave., Jersey City Heights, N.J.
Fougue, Joseph,
Res. unknown.
Fowler, Joseph W.,
200 W. Green st., Louisville, Ky.
Fox, Peter P.,
Woodland ave. & 73d st., Philadelphia, Pa.
Fraisse, Louis A.,
Main st., Houma, Terrebonne Parish, La.
Frames, J. Fuller,
601 N. Gay st., Baltimore, Md.
Franken, James L.,
Main & 3d South sts., Salt Lake City, Utah.
Franklin, Philip H.,
N. side Public Square, Marshall, Mo.
Fraser, Horatio N.,
262 5th ave., New York, N. Y.
Fraser, Robert P.,
Water st., Pictou, Nova Scotia.
Frauer, Herman E.,
246 E. Washington st., Indianapolis, Ind.
Freeman, William B.,
127 Gordon st., West End, Atlanta, Ga.

French, Harry B.,
429 Arch st., Philadelphia, Pa.
French, John I.,
Woburn, Mass.
Frerksen, Richard C.,
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Frohwein, Richard,
121 1st st., Elizabethport, N. J.
Frost, William A.,
119 E. 3d st., St. Paul, Minn.
Frye, George C.,
320 Congress st., Portland, Me.
FULLER, OLIVER F.,
220 Randolph st., Chicago, Ill.
Furl, Irwin W.,
821 Jefferson st., Phoenix, Ariz.
Gale, Edwim O..
85 S. Clark st., Chicago, Ill.
Gale, William H.,
82 S. Clark st., Chicago Ill.
Gallagher, Charles K.,
2d st., Washington, N. C.
Gallagher, John C.,
466 Grove St., Jersey City, N. J.
Galt, Edward P.,
924 Broad st., Selma, Ala.
Gammon, Irving P.,
150 Dudley st., Boston, Mass.
Gane, Eustace H.,
91 Fulton st., New York, N. Y.
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Gaus, Lewis H.,
254 S. Pearl st., Albany, N. Y.
Gausewitz, Wm. J. F.,
Bridge st., Owatonna, Minn.
Gayle, John W.,
Ann & Market sts., Frankfort, Ky.
Gayner, John N.,
Grove City, Minn.
Gee, Charlie,
116 W. Erwin st., Tyler, Tex.
Gegelein, Frederick L.,
Lexington & Russell aves., Cleveland, O.
Geier, Oscar W.,
175 Main st., Carrollton, Ky.
Geiger, Charles F.,
Old Orchard, St. Louis Co., Mo.
Geisler, Joseph F.,
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George, Charles T.,
1306 N. 3d st., Harrisburg, Pa.
Gering, Henry P.,
Plattsmouth, Neb.
Gerhard, Samuel,
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Gessner, Emil A.,
301 Chapel st., New Haven, Conn.
Gibson, Charles,
74 State st., Albany, N. Y.
Gibson, James, E.,
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Gidday, Frederic C.,
534 4th ave., Detroit, Mich.
Gilbert, Charles A.,
1 Whittemore Pl., Providence, R. I.
Gill, George,
164 S. 4th ave., Mount Vernon, N. Y.
Gillett, John,
Coopersville, Ottawa Co., Mich.
Gilpin, Henry B.,
Light & Lombard sts., Baltimore, Md.
Girling, Robert N.,
344 Prytania st., New Orleans, La.
Gleim, John C.,
301 Superior st., Cleveland, O.
Glover, William H.,
591 Essex st., Lawrence, Mass.
Godbold, Fabius C.,
1245 Magazine st., New Orleans, La.
Godding, John G.,
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Good, James M.,
2348 Olive st., St. Louis, Mo.
Goodale, Harvey G.,
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Gooding, Charles I.,
135 Gay st., Knoxville, Tenn.
Goodrich, George H.,
Anoka, Minn.
Goodwill,
Goodwill Block, Minden, La.
Goodwin, Lester H.,
State & Main sts., Hartford, Coon.
Goodwin, William W.,
Newburyport, Mass.
Gordon, William J. M.,
710 Plum st., Cincinnati, O.

Gorgas, George A.,
6 Market Square, Harrisburg, Pa.
Gorman, John T. B.,
49 Melrose st., Boston, Mass.
Gosman, Adam J.,
Charles and Mulberry sts, Baltimore, Md.
Grahame, Israel J.,
28 N. 12th st., Philadelphia, Pa.
Grambois, Augustin,
121 Esplanade st., New Orleans, La.
Grandjean, Charles,
2828 N. 14th st., St. Louis, Mo.
Grandjean, Eugene,
2828 N. 14th st., St. Louis, Mo.
Graner, Albert,
449 St. Charles st., New Orleans, La.
Graner, William,
470 Baronne st., New Orleans, La.
Grassly, Charles W..
287 W. 12th st., Chicago, Ill.
Gray, Henry R.,
122 St. Lawrence st., Montreal, Can.
Gray, William,
843 Fulton st., Chicago, Ill.
Green, Benjamin,
12 Market Square, Portsmouth, N. H.
Green, Hamer H.,
220 N. Centre st., Bloomington, Ill.
Green, Robert M.,
Myers st., Oroville, Butte co., Cal.
Greene, William R.,
1 Westminster st., Providence, R. I.
Gregory, Willis G.,
530 Main st., Buffalo, N. Y.
Greiner, William E.,
104 N. Side Sq., Paris, Tex.
Greve, Charles M.,
6th & Market sts., Chattanooga, Tenn.
Greve, Theodore L. A.,
John & 6th sts., Cincinnati, O.
Greyer, Julius,
Vine & Findlay sts., Cincinnati, O.
Griffen, Truman,
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GRIFFITH, ALBERT R.,
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Gross, Edward Z.,
119 Market st., Harrisburg, Pa.
Grossklaus, John F.,
High st. and Public Square, Navarre, O.
Grossman, Edward L.,
1301 Steiner st., San Francisco, Cal.
Grosvenor, Daniel P.,
35 Main st., Peabody, Mass.
Gundrum, George,
Ionia, Mich.
Haake, William H.,
85 Greenwood st., Cleveland, O.
Habliston, Charles C.,
500 E. Baltimore st., Baltimore, Md.
Haggarty, Mary,
Eyota, Minn.
Haight, William B.,
Care Lockwood & Haight, Stamford, Conn.
Hale, Chester S.,
974 Main st., Worcester, Mass.,
Hall, Alden T.,
362 St. Peter st., St. Paul, Minn.
Hall, Charles K.,
77 Tchoupitoulas st., New Orleans, La.
Hall, Edwin B.,
173 Main st., Wellsville, Allegheny co., N.Y.
Hall, Nettie C.,
Main st., Wessington Springs, So. Dak.
Hall, William A.,
Cass & Lafayette sts., Greenville, Mich.
Hallberg, Carl S. N.,
358 Dearborn st., Chicago, Ill.
Hamilton, Claude C.,
913 East 10th st., Kansas City, Mo.
Hamlin, James A.,
716 Massachusetts st., Lawrence, Kans.
Hance, Edward H.,
Callowhill & Marshall sts., Phila., Pa.
Hancock, Charles W.,
3421 Spring Garden st., Philadelphia, Pa.
Hancock, Franklin W.,
Oxford, N. C.
Hancock, John F.,
4 South Howard st., Baltimore, Md.
Hancock, J. Henry,
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Hannan, Owen B.,
693 Cedar ave., Cleveland, O.
Hardigg, William L.,
2d near Main st., Uniontown, Ky.
Hardin, John H.,
124 Front st., Wilmington, N. C.
Harding, Lawrence A.,
16 E. 7th st., St. Paul, Minn.
Hardy, Cyrus D.,
237 Westminster st., Providence, R. I.
Hargrave, Benj. W.,
Nasby st., Wilson, N. C.

Harlow, Noah S.,
4 Smith's Block, Bangor, Me.
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Harrah, John W.,
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Harris, Francis M.,
814 Main st., Worcester, Mass.
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305 Brady st., Davenport, Ia.
Harrison, Richard H. M.,
Broad & Foushee st., Richmond, Va.
Harter, Isaac F.,
Stronghurst, Ill.
Hartnett, Eugene,
105 Montgomery st., Jersey City, N. J.
Hartshorn, Frederick A.,
15 Mechanics' st., Marlborough, Mass.
Hartwig, Charles F.,
476 Milwaukee ave., Chicago, Ill.
Hartwig, Otto J.,
1570 Milwaukee ave., Chicago, Ill.
Harvey, John M.,
407 Delaware ave., Wilmington, Del.
Hassebrock, Henry F.,
1901 Wright st., St. Louis, Mo.
Hassinger, Samuel E. R.,
Fairmount ave. & 23d st., Philadelphia, Pa.
Hassler, Alfred J.,
Haywards, Alameda co., Cal.
Hattenbauer, Robert C.,
La Salle, Ill.
Hatton, Edgar M.,
56 S. Fourth st., Columbus, O.
Hatton, Ellmore W.,
90 N. High st., Columbus, O.
Hauenstein, William,
375 Amsterdam ave., New York, N. Y.
Haussamen, Henry L.,
Grafton, N. Dak.
Haussmann, Frederick W.,
907 Hutchinson st., Philadelphia, Pa.
Haviland, Henry,
488 Nostrand ave., Brooklyn, N. Y.
Hawkins, M. Smith,
84 Main st., Salem, Columbiana co., O.
Hawley, Wm. B.,
308 Main st., Faribault, Minn.
Hay, Edward A.,
Middle & Free sts., Portland, Me.
Hay, Henry H.,
Middle & Free sts., Portland, Me.
Hayes, Horace P.,
312 Elk st., Buffalo, N. Y.
Hayes, James H.,
305 Sumner st., E. Boston, Mass.
Haynes, David O.,
106 Fulton st., New York, N. Y.
Hays, Joseph A.,
98 William st., New York, N. Y.
Hechler, George L.,
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Heddens, Claus H.,
117 Wells st., Chicago, Ill.
Hedley, Thomas A.,
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Hepburn, John,
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Herbst, William P.,
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Hoffman, Julius,
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Holland, George,
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Holland, Samuel S.,
Smithfield & Liberty sts., Pittsburgh, Pa.
Hollister, Albert H.,
3 N. Pinckney st., Madison, Wis.
Holmes, Clay W.,
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Holmes, Henry E.,
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Holverson, Henry T.,
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Holzhauer, Charles,
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Holzhauer, Gustavus,
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Homer, John,
156 High st., Newburyport, Mass.
Hood, Charles I.,
Merrimac & Central sts., Lowell, Mass.
Hopp, Lewis C.,
198 Euclid ave., Cleveland, O.
Horn, Wilbur F.,
32 West Main st., Carlisle, Pa.
Horne, Henry R.,
Hay st., Fayetteville, Cumberland co., N. C.
Houghton, Harry J.,
Wentworth ave. & 66th st., Englewood, Ill.
Houser, Charles G.,
Mine La Motte, Mo.
Hover, William A.,
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Howard, Fletcher,
Sheldon, Ia.
Howland, Edgar J.,
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Howson, Arthur B.,
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Hoyt, George M.,
East Weymouth, Mass.

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Hudgins, Ernest F.,
473 Church st., Norfolk, Va.
Hudnut, Alexander,
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Hudson, Arthur,
Centre st., Newton, Mass.
Hudson, T. F.,
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Huecker, John,
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Huhn, George,
123 Nicollet st., Minneapolis, Minn.
Hunt, Denis D.,
301 5th st., San Francisco, Cal.
Hunter, Buxton W.,
Fayetteville st., Raleigh, N. C.
Hunter, Henry B.,
145 N. 10th st., Philadelphia, Pa.
Huntington, William H.,
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Hurd, John C.,
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Hurlebaus, George W.,
2030 14th st. N. W., Washington, D. C.
Hurty, John N.,
104 N. Penn st., Indianapolis, Ind.
Huston, Charles,
47 S. High st., Columbus, O.
Hutchins, Isaiah,
West Acton, Mass.
Hutton, Harry D.,
1033 22d st., N. W., Washington, D. C.
Hydren, Carl,
223 North st., Pittsfield, Mass.
Hyler, William H.,
Port Chester, N. Y.
Hynson, Henry P.,
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Ingalls, Albert O.,
Murray, Shoshone co., Idaho.
Ingalls, John,
4th & Poplar sts., Macon, Ga.
Ink, Charles E.,
Columbiana, O.
Irvin, William A.,
El Paso, Texas.
Jacobs, Joseph,
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Jacocks, John T.,
Covington, Tipton co., Tenn.
JACQUES, GEORGE W.,
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Jennings, N. Hynson,
336 N. Charles st., Baltimore, Md.
Jesson, Jacob,
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Jewell, Walter H.,
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Joergensen, Sophus,
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Johnson, Charles B.,
54 Third st., Middletown, O.
Johnson, Daniel D.,
Concord, N. C.
Johnson, Frank W.,
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Jones, David F.,
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Jones, Edward B.,
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Jones, James H.,
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Jones, James T.,
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Jones, Simon N.,
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Joy, Edwin W.,
Market & Powell sts., San Francisco, Cal.
Joyce, Robert,
67 Bank st., Newark, N. J.
Judisch, George,
W. 5th & Walnut sts., Des Moines, Ia.
Jungkind, John A.,
806 Main st., Little Rock, Ark.
Jungmann, Julius,
1047 3d ave., New York, N. Y.

Kaczorosky, Adolph O.,
1811 London ave., New Orleans, La.
Kaiser, William O.,
904 6th ave., Des Moines, Ia.
Kalish, Julius,
413 Grand st., New York, N. Y.
Karb, George J.,
4th & Main sts., Columbus, O.
Kauffman, George B.,
235 N. High st., Columbus, O.
Kebler, Lyman F.,
305 Cherry st., Philadelphia, Pa.
Keefer, Charles D.,
Main & Queen sts., Chambersburg, Pa.
Keenan, Thomas J.,
65 W. Broadway, New York, N. Y.
Keene, Thomas R.,
256 Elm st., Dallas, Tex.
Keeney, Caleb R.,
16th & Arch sts., Philadelphia, Pa.
Keith, Irwin A.,
Lake Preston, Kingsbury Co., S. Dak.
Kellam, Chas. R. J.,
Heron Lake, Minn.
Kelley, Edward S.,
392 Boylston st., Boston, Mass.
Kelly, George A.,
101 Wood st., Pittsburg, Pa.
Kelley, Gilliam Jeter,
20 Williams st., Atlanta, Ga.
Kemp, Edward,
68 William st., New York, N. Y.
Kennedy, Ezra J.,
106 Fulton st., New York, N. Y.
Kennedy, George W.,
103 N. Centre st., Pottsville, Pa.
Kenney, Herbert E.,
Taunton, Mass.
Kent, Henry A., Jr.,
Park Drug Store, Elizabeth, N. J.
Kent, Robert R.,
Apopka, Orange Co., Fla.
Kenworthy, John,
Coatesville, Pa.
Keppler, Charles L.,
461 Dryades st., New Orleans, La.
Keppler, Christian L.,
461 Dryades st., New Orleans, La.
Kerr, Frank G.,
Van Buren, Ark.
Kerr, William W.,
Russellville, Ark.
Kershaw, John P.,
St. Joseph, La.
Kiedaisch, John F., Jr.,
1028 Main st., Keokuk, Ia.
Kieffer, George,
620 Lorain st., Cleveland, O.
Kienth, Hans,
608 Mitchell st., Milwaukee, Wis.
Kilbourne, Lewis P.,
Bayou Sara, La.
Kilmer, Frederick B.,
17 Codnise ave., New Brunswick, N. J.
King, George A. N.,
100 Washington ave., Minneapolis, Minn.
KING, JAMES T.,
Main & South sts., Middletown, N. Y.
Kinnear, James A.,
Deming, N. Mex.
Kirchgasser, William C.,
5347 S. Halsted st., Chicago, Ill.
Kirchhofer, Paul,
Massillon, Stark Co., O.
Kirkland, Derwentwater,
320 S. Spring st., Los Angeles, Cal.
Klauber, Charles N.,
566½ Elm st., Dallas, Tex.
Klayer, Louis,
9th & Elm sts., Cincinnati, O.
Klein, Ernest F.,
218 Central ave., Hot Springs, Ark.
Klein, Frederick,
323 W. Madison st., Chicago, Ill.
Klie, G. H. Charles,
5100 N. Broadway, St. Louis, Mo.
Kline, Charles G.,
430 Roane st., Harriman, Tenn.
Kline, Charles S.,
19th & Welton sts., Denver, Colo.
Kline, Mahlon N.,
427 Arch st., Philadelphia, Pa.
Klotz, August E.,
471 N. Ashland ave., Chicago, Ill.
KLUSSMANN, HERMANN,
4th st. & Lafayette ave., Hoboken, N. J.
Knabe, Gustavus A.,
Court Square & Dexter av., Montgomery, Ala.
Knoebel, Thomas,
209 Collinsville ave., East St. Louis, Ill.
Knoefel, Charles D.,
7 E. Market st., New Albany, Ind.
Knudsen, Rudolph H.,
285 Noble st., Chicago, Ill.

Koch, Julius A.,
12th & Carson sts., Pittsburg, Pa.
Koch, Louis,
329 N. 4th st., Philadelphia, Pa.
Kochan, John,
1463 Larimer st., Denver, Colo.
Koehnken, Herman H.,
4th & Mill sts., Cincinnati, O.
Koles, Samuel M.,
945 First ave., New York, N. Y.
Kraemer, Henry,
115 W. 68th st., New York, N. Y.
Krehe, J. Theodor,
314 E. 2d st., Muscatine, Iowa.
Kremers, Edward,
435 Park st., Madison, Wis.
Krewson, William E.,
1836 Franklin st., Philadelphia, Pa.
Krieger, Philip,
Tompkins, cor. Myrtle ave., Brooklyn, N. Y.
Kuder, William F.,
342 Jennings ave., Cleveland, O.
Kuhn, Norman A.,
124 S. 15th st., Omaha, Neb.
Kurfurst, Henry F.,
502 Xenia ave., Dayton, O.
La Pierre, Elie H.,
96 River st., Cambridgeport, Mass.
La Rue, William I.,
Athens, Texas.
Lachance, Seraphin,
1538 St. Catherine st., Montreal, Can.
Lahme, Charles A.,
428 Main st., Kansas City, Mo.
Laing, Alfred A.,
273 Pearl st., Cambridgeport, Mass.
Laird, John,
Diamond P. O., Ark.
Lalmant, Eugene,
Gasquet & Claiborne sts., New Orleans, La.
Lampa, Robert R.,
128 William st., New York, N. Y.
Lanctot, Henri,
299½ St. Lawrence st., Montreal, Can.
Land, Robert H.,
812 Broad st., Augusta, Ga.
Lander, John C.,
Yorkville, Toronto, Can.
Lane, Edward B.,
1238 Euclid ave., Cleveland, O.
Last, Louis,
319 Reed st., Moberly, Mo.
Lavigne, Jean B.,
261 N. Poydras st., New Orleans, La.
Lawbaugh, Emanuel S.,
2d & Walnut sts., St. Mary's, Mo.
Lawton, Charles H.,
113 Union st., New Bedford, Mass.
Lawton, Horace A.,
113 Union st., New Bedford, Mass.
Layton, Thomas,
2743 N. Grand ave., St. Louis, Mo.
Leavitt, Miner L. H.,
65 Cambridge st., Boston, Mass.
Lee, Charles H.,
Main st., New Iberia, La.
Lee, James A.,
Main st., New Iberia, La.
Leenheer, Bastian,
871 W. 22d st., Chicago, Ill.
Legendre, Joseph A.,
25 Dauphin st., New Orleans, La.
Lehmann, Louis,
1231 N. Halsted st., Chicago, Ill.
Lehn, Louis,
454 Broom st., Brooklyn, N. Y.
Lehnkering, Charles F.,
744 Eastern ave., Cincinnati, O.
Lehr, Philip,
1145 Lorain st., Cleveland, O.
Leine, Arthur M.,
P. O. Box 601, Honesdale, Pa.
Leis, George,
747 Massachusetts st., Lawrence, Kan.
Leist, Jacob L.,
100 E. Washington st., Indianapolis, Ind.
Leitch, Arthur,
2348 Olive st., St. Louis, Mo.
Lemberger, Joseph L.,
5 N. 9th st., Lebanon, Pa.
Leonardi, Sydney B.,
Franklin st., Tampa, Fla.
Leonhard, Rudolph E.,
P. O. Box 46, Paterson, N. J.
Lernhart, August,
P. O. Box 10, Centreville, Alameda co., Cal.
Levinson, Joseph,
11 Main st., Napa, Cal.
Levy, Adolph,
145 Grand st., E. D., Brooklyn, N. Y.
Levy, William M.,
1382 Magazine st., New Orleans, La.
Lewis, Ernest G.,
701 Centre st., Jamaica Plain, Mass.

Libby, Henry F.,
Main st., Pittsfield, Me.
Lilly, Eli,
Care of Eli Lilly & Co., Indianapolis, Ind.
Lilly, Josiah K.,
Indianapolis, Ind.
Lillybeck, Oscar,
5th st. & 23d ave., Meridian, Miss.
Lisle, Justin D.,
Yellow Springs & High st., Springfield, O.
Livingston, Barent V. B.,
306 Broadway, Brooklyn, N. Y.
Llewellyn, John F.,
Public Square, Mexico, Audrian co., Mo.
Lloyd, John U.,
Court & Plum sts., Cincinnati, O.
Lockert, Charles L.,
96 Franklin st., Clarksville, Tenn.
Loehr, Theodore C.,
Carlinville, Macoupin co., Ill.
Loelkes, Alexander G.,
3d ave. & 18th st., New York, N. Y.
Long, Jonathan C.,
Fee Corrugs Drug Store, Aspen, Colo.
Loomis, John C.,
Chestnut & Watt sts., Jeffersonville, Ind.
Lord, Frank J.,
1101 Larimer st., Denver, Colo.
Lord, Thomas,
72 Wabash ave., Chicago, Ill.
Lovis, Henry C.,
2137 7th ave., New York, N. Y.
Lowd, John C.,
43 Temple Place, Boston, Mass.
Lowden, John,
53 Colborne st., Toronto, Can.
Lowe, Clement B.,
1125 Mt. Vernon st., Philadelphia, Pa.
Lueder, Fritz,
511 S. Adams st., Peoria, Ill.
Lundberg, John C.,
186 W. Madison st., Chicago, Ill.
Lyman, Asahel H.,
427 W. River st., Manistee, Mich.
Lyons, Albert B.,
Honolulu, Sandwich Islands.
Lyons, Fred. W.,
464 Bergen ave., Jersey City, N. J.
Lyons, Isaac L.,
42 Camp st., New Orleans, La.
MacDonald, Allan D.,
233½ Duffy st., Savannah, Ga.
Macdonald, Daniel T.,
Red Jacket, Houghton co., Mich.
MacRae, John Y.,
Martin & Market st., Raleigh, N. C.
Macy, Sherman R.,
Highland Park Normal Coll., Des Moines, Ia.
Main, Thomas F.,
278 Greenwich st., New York, N. Y.
Maine, August,
352 Whitesboro st., Utica, N. Y.
Maisch, Henry C. C.,
10th & Ogden sts., Philadelphia, Pa.
Majer, Oscar,
400 S. 2d st., Clinton, Ia.
Major, John R.,
800 7th st., Washington, D. C.
Mallinckrodt, Edward,
Mallinckrodt & Main sts., St. Louis, Mo.
Mann, Albert,
39 S. Main st., Ann Arbor, Mich.
Manning, John H.,
51 North st., Pittsfield, Mass.
Markoe, George F. H.,
27 Central st., Boston, Mass.
Marshall, Ernest C.,
157 Bunker Hill st., Charlestown, Mass.
Marshall, Rush P.,
16th & Race sts., Philadelphia, Pa.
Marsteller, George L.,
231 King st., Charleston, S. C.
Martin, John C.,
U. S. Nav. Dispensary, Washington, D. C.
Martin, Nicholas H.,
8 Windsor Crescent, Newcastle-on-Tyne, Eng.
Martinez, Robert J.,
Bay & Bridge sts., Jacksonville, Fla.
Mason, Alfred H.,
59 Maiden Lane, New York, N. Y.
Mason, George L.,
Palouse, Wash.
Mason, Harry Ruggles,
402 Centre st., Newton, Mass.
Massey, William M.,
1129 Broadway, New York, N. Y.
Matkin, George G.,
Care of J. M. Pelters, Ennis, Tex.
Matthews, Charles E.,
221 Randolph st., Chicago, Ill.
May, Arthur F.,
227 Garden st., Cleveland, O.
May, Eugene,
Canal & Chartres sts., New Orleans, La.

May, James O.,
Water st., Naugatuck, Conn.
Mayo, Caswell A.,
65 Broadway, New York, N. Y.
McAfee, John J.,
252 Beauregard st., Mobile, Ala.
McColgan, Adam T.,
507 Tremont st., Boston, Mass.
McComas, Percy G.,
1801 Vermont ave., Washington, D. C.
McConville, Thomas A.,
Residence unknown.
McCoy, Clarence H.,
78 E. 2d South st., Salt Lake City, Utah.
McCrea, Harry F.,
17th & Champa sts., Denver, Colo.
McDonald, George,
Main & Burdick sts., Kalamazoo, Mich.
McElhenie, Thomas D.,
259 Ryerson st., Brooklyn, N. Y.
McElwee, Emer J.,
517 Main st., Mount Pleasant, Pa.
McFarland, Andrew,
693 Michigan ave., Detroit, Mich.
McFarland, George F,,
203 Central ave., Dover, N. H.
McFarland, Robert M.,
2d & Elm sts., Henderson, Ky.
McGeorge, William,
Metropolitan ave. & 2d st., Argentine, Kan.
McGill, John T.,
Vanderbilt University, Nashville, Tenn.
McIntyre, Byron F.,
121 Munn ave., East Orange, N. J.
McIntyre, Ewen,
303 W. 74th st., New York, N. Y.
McIntyre, William,
2429 Frankford ave., Philadelphia, Pa.
McKesson, G. Clinton,
91 Fulton st., New York, N. Y.
McKesson, John, Jr.,
91 Fulton st., New York, N. Y.
McLean, George,
Orrick, Ray co., Mo.
McMeel, James H.,
Lost Nation, Ia.
McMichael, Americus O.,
1438 Grand ave., Des Moines, Ia.
McNeil, John M.,
143 Broadway, Scottdale, Westm'l'd co., Pa.
McPherson, George,
Residence unknown.
Means, John C.,
123 N. Commerce st., Natchez, Miss.
Mebane, Robert S.,
336 Ashe st., Greensboro, N. C.
Mehl, Henry W.,
5th & Delaware sts., Leavenworth, Kan.
Meininger, Albert,
Hamilton & Chase aves., Cincinnati, O.
Meissner, F. W., Jr.,
820 Main st., La Porte, Ind.
Mellor, Alfred,
218 N. 22d st., Philadelphia, Pa.
Melville, William M.,
Lima, O.
Melvin, Samuel H.,
6th ave. & 14th st., East Oakland, Cal.
Mennen, Gerhart,
577 Broad st., Newark, N. J.
Merrell, Ashbel H.,
1021 6th ave. W., Topeka, Kan.
Merrell, Charles G.,
6th st. & Eggleston ave., Cincinnati, O.
Merrell, George,
6th st. & Eggleston ave., Cincinnati, O.
Metz, Abraham L.,
Prytania st., New Orleans, La.
MEYER, CHRISTIAN F. G.,
4th st. and Clark ave., St. Louis, Mo.
Meyer, William V.,
338 Superior st., Cleveland, O.
Michaelis, Gustavus,
1 Myrtle ave, Albany, N. Y.
MILHAU, EDWARD L.,
183 Broadway, New York, N. Y.
MILLER, ADOLPH W.,
3d & Callowhill st., Philadelphia, Pa.
Miller, Emerson R.,
Polytechnic Inst., Auburn, Ala.
Miller, Jacob A.,
2d & Chestnut sts., Harrisburg, Pa.
Miller, James M.,
Main st., Vacaville, Solano co., Cal.
Miller, Jason A.,
7 N. Main st., Gloversville, N. Y.
Miller, Polk,
900 Main st., Richmond, Va.
Miller, Turner Ashby,
431 E. Broad st., Richmond, Va.
Milligan, Decatur,
509 N. 2d st., Philadelphia, Pa.
Miner, Maurice A.,
2421 Dearborn st., Chicago, Ill.

Miner, Mrs. Mary O.,
Hiawatha, Brown co., Kan.
Miner, Orrin E.,
3 Front st., Noank, Conn.
Mittelbach, William,
114 Main st., Boonville, Mo.
Miville, Francis C.,
1024 Elm st., Manchester, N. H.
Moffett, Thomas J.,
Edinburg, Ind.
Moffit, Thomas S.,
2119 Webster st., San Francisco, Cal.
Mohr, Charles,
931 Dauphin st., Mobile, Ala.
Mohr, Chas. A.,
931 Dauphin st., Mobile, Ala.
Moith, Augustus T.,
1 Ferry st., Fishkill, N. Y.
Molwitz, Ernest,
2707 8th ave., New York, N. Y.
Moody, Richard H.
Main & High sts., Belfast, Me.
Moore, Charles G.,
Eufaula, Indian Territory.
Moore, George,
26 Market st., Somersworth, N. H.
Moore, Joachim B.,
13th & Lombard sts., Philadelphia.
Moore, John T.,
1012 Rhode Island st., Lawrence, Kan.
Moore, Josh. F.,
4th st., Meridian, Miss.
Moore, Silas H.,
80 4th st., Sioux City, Ia.
Moore, Thos. F.,
Cor. Dauphin & Conception st., Mobile, Ala.
Mork, Thomas K.,
Wheaton, Minn.
Morgan, Aylmer L.,
Washington & Adam sts., Camden, Ark.
Morgan, Eugene H.,
Granbury, Hood co., Tex.
Morland, Robert L.,
132 State st., Chicago, Ill.
Morley, William J.,
214 S. Main st., St. Louis, Mo.
Morris, Lemuel I.,
720 N. Broad st., Philadelphia, Pa.
Morrison, Joseph E.,
33 Church st., Montreal, Can.
Morison, J. Louis D.,
145 N. 10th st., Philadelphia, Pa.
Morse, C. Milan,
92 Main st., Nashua, N. H.
Morton, John W.,
521 Garrison ave., Fort Smith, Ark.
Morwessel, Henry,
90 W. 6th st., Covington, Ky.
Mosher, William W.,
13 Colony st., Meriden, Conn.
Moulton, Daniel P.,
213 Lisbon st., Lewistown, Me.
Mowry, Albert D.,
329 Warren st., Boston, Mass.
Mueller, Adolph,
Cherry st., Highland, Ill.
Mueller, Ambrose,
Webster & Jefferson aves., Kirkwood, Mo.
Mueller, Otto E.,
801 E. Madison st., Louisville, Ky.
Muir, Ebenezer,
595 Lagauchetiere st., Montreal, Can.
Mulcahy, Daniel D.,
831 N. Capitol st., Washington, D. C.
Murphy, John J.,
Pittsfield, Mass.
Murray, Emmett L.,
Americus, Ga.
Muth, George L.,
15 E. Fayette st., Baltimore, Md.
Myers, Daniel,
111 Water st., Cleveland, O.
Myers, George W.,
Lakeport, Cal.
Naly, Sarah L.,
1532 Court Place, Denver, Colo.
Nattans, Arthur,
2d & D sts. N. W., Washington, D. C.
Neathery, James N.,
North side Jefferson st., Van Alstyne, Tex.
Neppach, Stephen A.,
Fruit Vale, Alameda co., Cal.
Netz, Richard H. G.,
Owatonna, Minn.
Newbold, Thomas M.,
608 S. 42d st., Philadelphia, Pa.
Newman, George A.,
5th & Walnut sts., Louisville, Ky.
Newman, George A.,
380 Myrtle ave., Brooklyn, N. Y.
Newton, Philo W.,
142 Asylum st., Hartford, Conn.
Nicholas, John C.,
55 State st., New London, Conn

Nicholas, Thomas B.,
178 Essex st., Salem, Mass
Nickey, Frank B.,
125 E. Main st., Muncie, Ind.
Nipgen, John A.,
Paint & 2d sts., Chillicothe, O.
Nisbet, William W.,
Washington ave., Pittsburgh, Pa.
Noble, William W.,
Berea, Cuyahoga co., O.
Noll, Matthias,
627 Commercial st., Atchison, Kan.
Nordman, Herman,
1231 E. Preston st., Baltimore, Md.
Norton, George E.,
223 Putnam ave., Cambridgeport, Mass.
Nowers, Lawrence E.,
Hillsborough, N. Mex.
Ogier, John M.,
816 Wheeling ave., Cambridge, O.
O'Hare, James,
6 Benefit st., Providence, R. I.
O'Neil, Henry M.,
463 Hudson st., New York, N. Y.
Oberdeener, Samuel,
Franklln st., Santa Clara, Cal.
Odell, Willis B.,
So. Englewood, Cook co., Ill.
Ogden, John,
1233 Walnut st., Philadelphia, Pa.
Oglesby, George D.,
Lake ave. & 50th st., Chicago, Ill.
Ohliger, Lewis P.,
23 West Liberty st., Wooster, O.
Oldberg, Oscar,
2421 Dearborn st., Chicago, Ill.
Oleson, Olaf M.,
Fort Dodge, Ia.
Oliver, William M.,
132 Broad st., Elizabeth, N. J.
Oliff, James H.,
200 Arlington ave., Plainfield, N. J.
ORNE, JOEL S.,
493 Main st., Cambridgeport, Mass.
Ortmann, John H ,
450 Dauphin st., Mobile, Ala.
Orton, Ingomar F.,
13th st., Galveston, Tex.
Osgood, Hugh H.,
148 Main st., Norwich Conn.
Osmund, Charles A.,
13 7th ave,, New York, N. Y.
Otis, Clark Z.,
63 Court st., Binghamton, N. Y.
Ottinger, James J.,
20th & Spruce sts,, Philadelphia, Pa.
Otto, John N. W.,
76 S. Rampart st., New Orleans, La.
Overstreet, William P.,
1624 15th st., Louisville, Ky.
Owens, James A.,
45 Dominick st., Rome, N. Y.
Owens, Richard J.,
Myrtle ave. & Spencer st., Brooklyn, N. Y.
Paine, James D.,
P. O. Box 64, Rochester, N. Y.
Parcher, George A.,
14 Main st., Ellsworth, Me.
Parisen, Allen C.,
Broadway & David st., South Amboy, N. J.
Parisen, George W.,
Smith & High sts., Perth Amboy, N. J.
Parker, Arthur S.,
747 Woodward ave., Detroit, Mich.
Parker, George H.,
Draper's Block, Main st., Andover, Mass.
Parker, Walter W.,
Main st., Henderson, N. C.
Parker, William S.,
Lisbon, N. Dak.
Parkill, Stanley E.,
Owosso, Shiawassee co., Mich.
Parr, John C.,
1432 S. Main st., Los Angeles, Cal.
Parrott, John,
Littleton, Halifax co., N. C.
Parsons, John,
194 31st st., Chicago, Ill.
Partridge, Charles K.,
Granite Block, Augusta, Me.
Partridge, Frank R.,
Water st., Augusta, Me.
Patch, Edgar L.,
P. O. Box 639, Stoneham, Mass.
Patten, I. Bartlett,
333 Washington st., Boston, Mass.
Patterson, Theodore H.,
3640 Cottage Grove ave., Chicago, Ill.
Pattison, Charles H.,
Grand Crossing, Ill.
Pattison, George H.,
7841 Eggleston ave., Station P., Chicago, Ill.
Patton, John F.,
237 W. Market st., York, Pa.

Pauley, Frank C.,
Eastern st. & Compton ave., St. Louis, Mo.
Payne, George F.,
State Capitol, Atlanta, Ga.
Peabody, William H.,
8 S. Division st., Buffalo, N. Y.
Peacock, Josiah C.,
3909 N. 5th st., Philadelphia, Pa.
Pearce, Howard A.,
370 Elmwood ave., Providence, R. I.
Pease, Autumn V.,
Fairbury, Neb.
Pease, Francis M.,
Main st., Lee, Mass.
Peck, George L.,
Hall of Pharmacy, Jamaica, N. Y.
Peniston, Paul,
Palmetto, Ga.
Pennington, T. H. Sands,
14 2d st., Troy, N. Y.
Percy, William G.,
Brainerd, Minn.
Perham, Henry A.,
Main st., Lexington, Mass.
Perkins, Benjamin A.,
16 Pine st., Portland, Me.
Perkins, C. William,
297 Main st., New Britain, Conn.
Perkins, William A.,
84 S. C st., Virginia City, Nev.
Perot, T. Morris,
1810 Pine st., Philadelphia, Pa.
Perry, Frederick W. R.,
709 Woodward ave., Detroit, Mich.
Peter, Minor C.,
832 Sixth st., Louisville, Ky.
Peterson, J. Otto,
1501 Washington ave. S., Minneapolis, Minn.
Petsche, Bismarck W.,
Arlington Chemical Co., Yonkers, N. Y.
PETTIT, HENRY M.,
15 S. Main st., Carrollton, Mo.
Peyton, Robert D.,
1317 4th ave., Louisville, Ky.
Pfafflin, Henry A.,
402 S. Delaware st., Indianapolis, Ind.
Pfeiffer, John,
241 Nostrand ave., Brooklyn, N. Y.
Pfiffner, Fritz J. R.,
38 N. Sandusky st., Delaware, O.
PFINGST, FERDINAND J.,
18th & Main sts., Louisville, Ky.
Pfunder, William,
3d & Oak sts., Portland, Oregon.
Phelps, Dwight,
337 Main st., West Winsted, Conn.
Phillimore, Fred. S.,
331 Hanover st., Boston, Mass.
Phillips, Carrie Elizabeth,
17 Wyeth st., Cambridge, Mass.
Phillips, Charles W.,
484 Eastern ave., Cincinnati, O.
Phillips, Edwin F.,
4 E. Main st., Armada, Mich.
Physick, Henry S.,
3104 Easton ave., St. Louis., Mo.
Pickett, John H.,
Oskaloosa, Mahaska Co., Ia.
Pieck, Edward L.,
6th & Main sts., Covington, Ky.
Pierce, William H.,
316 Shawmut ave., Boston, Mass.
Pile, Gustavus,
770 Passyunk ave., Philadelphia, Pa.
Pinniger, William,
2 Virginia st., Reno, Nev.
Pitt, John R.,
218 Main st., Middletown, Conn.
Plaut, Albert,
128 William st., New York, N. Y.
Pleasants, Charles H.,
61 West Houston st., New York, N. Y.
Plenge, Henry.
8 Broad st., Charleston, S. C.
Plummer, David G.,
6 Main st., Bradford, Stark Co., Ill.
Plummer, Edward,
405 5th ave., New York, N. Y.
Plummer, Joseph W.,
504 Simonton st., Key West, Fla.
Porter, Chilton S.,
Somerset, Pulaski Co., Ky.
Porter, Henry C.,
Main & Pine sts., Towanda, Pa.
Porter, Louis F.,
151 Winsor st., Cambridgeport, Mass.
Porter, Martin L.,
Danforth, Washington Co., Me.
Porter, Millett N.,
3850 State st., Chicago, Ill.
Porterfield, William C.,
Silver City, N. Mex.
Potter, William R.,
446 Broad st., Providence, R. I.

Potts, David G.,
24 S. 2d st., Philadelphia, Pa.
Powell, William C.,
Snow Hill, Md.
Power, Frederick B.,
Hudson, N. Y.
Prall, Delbert E.,
111 S. Jefferson ave., Saginaw, Mich.
Preissler, H. W.,
Shelbyville, Ky.
Prentiss, John B.,
905 E. 8th st., Terre Haute, Ind.
Prescott, Albert B.,
University of Michigan, Ann Arbor, Mich.
Prescott, Horace A.,
360 Washington st., Boston, Mass.
Preston, Andrew P.,
2 Congress Block, Portsmouth, N. H.
Preston, David,
9th & Lombard sts, Philadelphia, Pa.
Price, Charles H.,
226 Essex st., Salem, Mass.
Price, Joseph,
226 Essex st., Salem, Mass.
Prieson, Adolph,
Main & Vesper sts., Lock Haven, Pa.
Probeck, George J.,
223 Detroit st., Cleveland, O.
Procter, Wallace,
1900 Pine st., Philadelphia, Pa.
Puckner, William A.,
465 State st., Chicago, Ill.
Punch, William F.,
71 Dauphin st., Mobile, Ala.
Purcell, Nicholas S.,
King st., Leesburgh, Va.
Pursell, Howard,
Mill & Cedar sts., Bristol, Pa.
Pyle, Cyrus,
66 First Place, Brooklyn, N. Y.
Quackinbush, Benjamin F.,
703 Greenwich st., New York, N. Y.
Quandt, Arthur A.,
124 S. Howard st., Baltimore, Md.
Quandt, Ernest E.,
124 S. Howard st., Baltimore, Md.
Qvale, Victor A.,
Rochester, Minn.
Rademaker, Herman H.,
801 E. Madison st., Louisville, Ky.
Radford, Reuben L.,
129 Main st., Henderson, Ky.
Rains, A. Brown,
11 W. 7th st., Columbia, Tenn.
Ramsperger, Gustavus,
236 E. 23d st., New York, N. Y.
Rand, Daniel M.,
Main & Depot sts., S. Windham, Me.
Randall, Frank O.,
101 N. Main st., Brockton, Mass.
Rano, Charles O.,
1872 Niagara st., Buffalo, N. Y.
Rapelye, Charles A.,
325 Main st., Hartford, Conn.
Rauschkolb, John,
251 S. 4th st., Columbus, O.
Ray, Frederick E.,
901 K st., Sacramento, Cal.
Ray, Peter W.,
379 S. 2d st., Brooklyn, N. Y.
Raymond, Harry L.,
833 Massachusetts st., Lawrence, Kan.
Read, Albert M.,
1140 15th st. N. W., Washington, D. C.
Redsecker, Jacob H.,
810 Cumberland st., Lebanon, Pa.
Reed, Charles C.,
111 Kickosoo st., Lincoln, Ill.
Reed, James,
302 S. 6th st., Nebraska City, Neb.
Reed, Willoughby H.,
Marshall & Astor st., Norristown, Pa.
Reidy, Michael,
Shiawassee ave., Corunna, Mich.
Remington, Joseph P.,
1832 Pine st,, Philadelphia, Pa.
Renz, Frederick J.,
Market & Floyd sts., Louisville, Ky.
Reynolds, Howard P.,
Park & North aves., Plainfield, N. J.
Reynolds, John J.,
Water & Main Cross sts., Flemingsburg, Ky.
Reynolds, William K.,
354 Friendship st., Providence, R. I.
Rhode, Rudolph E.,
504 N. Clark st., Chicago, Ill.
Rhodes, Chas. O.,
4 Main st., Groton, N. J.
Rice, Charles,
Bellevue Hospital, New York, N. Y.
Rich, Willis S.,
166 Union st., Olean, N. Y.
Richardson, Horatio S.,
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Richardson, Thomas L.,
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Richter, Gustave A.,
801 S. Front st., Philadelphia, Pa.
Riddell, Benjamin F.,
8 Granite Block, Fall River, Mass.
Ridgway, Lemuel A.,
Fillmore, Allegany Co., N. Y.
Riesenman, Joseph,
1266 Liberty st., Franklin, Pa.
Riley, Charles W.,
1343 N. 13th st., Philadelphia, Pa.
Rittenhouse, Henry M.,
1705 N. 17th st., Philadelphia, Pa.
Rives, Edward B.,
56 N. Main st., Los Angeles, Cal.
Robbins, Alonzo,
11th & Vine sts., Philadelphia, Pa.
Robert, William H., Jr.,
431 W. Main st., Denison, Tex.
Roberts, Daniel J.,
Peabody, Marion co., Kan.
Robertson, Felix O.,
Searcy, White co., Ark.
Robins, Wilbur F.,
28 Main st., Littleton, N. H.
Robinson, Edward A.,
19 Warwick st., Lowell, Mass.
Robinson, Ernest F.,
832 Yonge st., Toronto, Can.
ROBINSON, JAMES S.,
2d & Madison sts., Memphis, Tenn.
Robinson, William A.,
49 Drummond st., Auburn, Me.
Rockefeller, Lucius,
Palisade ave., Englewood, N. J.
Rogers, Arthur H.,
Geneseo, Livingston co., N. Y.
Rogers, Henry H.,
224 Court st., Kankakee, Ill.
Rogers, Wiley,
15th & Chestnut sts., Louisville, Ky.
Rogers, William H.,
North st., Middletown, N. Y.
Rohde, Claus F.,
Spring Valley, Minn.
Rollins, John F.,
Fort George, Duval co., Fla.
ROSENGARTEN, MITCHELL G.,
17th & Fitzwater sts., Philadelphia, Pa.
Rosenthal, David A.,
Gay & Depot sts., Knoxville, Tenn.
Rosewater, Nathan,
111 Water st., Cleveland, O.
Roux, Nemours P.,
501 N. Rampart st., New Orleans, La.
Rowlinski, Robert A.,
104 Broughton st., Savannah, Ga.
Royster, Oliver M.,
Hickory, N. C.
Ruddiman, Edsel A.,
Vanderbilt Univ., Nashville, Tenn.
Rudolf, Eliza,
Dryades & 2d sts. New Orleans, La.
Ruenzel, Henry G.,
753 3d st., Milwaukee, Wis.
Ruete, Theodore W.,
568 Main st., Dubuque, Iowa.
Runyon, Edward W.,
497 5th ave., New York, N. Y.
Ruppert, John,
Price Hill, Cincinnati, O.
Rusby, Henry H.,
222 W. 132d st., New York, N. Y.
Russell, Dorian M.,
84 Canal st., Grand Rapids, Mich.
Russell, Eugene J.,
Army st. & Canton ave., Baltimore, Md.
Ryan, Frank G.,
145 N. 10th st., Philadelphia, Pa.
Sadtler, Samuel P.,
204 N. 34th st., Philadelphia, Pa.
Sample, Ellmer W.,
31 N. Second st., Ironton, O.
SANDER, ENNO,
129 S. 11th st., St. Louis, Mo.
Sanderson, Stephen F.,
828 Nicollet ave., Minneapolis, Minn.
Sargent, Ezekiel H.,
125 State st., Chicago, Ill.
Sargent, Jesse W.,
252 Pleasant st., Malden, Mass.
Sauer, Louis W.,
927 Central ave., Cincinnati, O.
Sauerhering, Rudolph A.,
Main st., Mayville, Dodge co., Wis.
Saunders, William,
Central Experim. Farm, Ottawa, Can.
Sautter, Louis,
S. Pearl & Plain sts., Albany, N. Y.
Sawyer, Willey W.,
426 E. State st., Rockford, Ill.
Sawyer, William F.,
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Sayre, Lucius E.,
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Schafer, George H.,
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Scheffer, Emil,
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Schetfer, Henry W.,
Care of Larkin & Scheffer, St. Louis, Mo.
Schellentrager, Ernst A.,
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383 N. State st., Chicago, Ill.
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170 William st., New York, N. Y.
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Schimpf, Henry W.,
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Schlaepfer, Henry J.,
Main & 2d sts., Evansville, Ind.
Schley, Steiner,
16 W. Patrick st., Frederick City, Md.
Schlotterbeck, Julius O.,
17 S. Ingalls st., Ann Arbor, Mich.
Schmid, Henry,
38 Ave. A, New York, N. Y.
Schmidt, Carl,
1871 Pearl st., Brooklyn Village, Cleveland, O.
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Schmidt, Florian C.,
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Schmidt, Frederick M.,
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Schmidt, Valentine,
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Schmitt, George J. F.,
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Schmitt, Joseph M.,
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Schmitter, Jonathan,
Maple st., Gypsum City, Saline co., Kan.
Schoenhut, Christie H.,
199 Superior st., Cleveland, O.
Schoettlin, Albert J.,
4th & Chestnut sts., Louisville, Ky.
Scholtz, Edmund L.,
16th & Stout sts., Denver, Colo.
Schrader, Herman v. R.,
Tallahassee, Fla.
Schrank, C. Henry,
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Schrouder, Benjamin,
209 E. Bridge ave., Grand Rapids, Mich.
Schueller, Ernst,
281 S. High st., Columbus, O.
Schueller, Frederick W.,
232 S. High st., Columbus, O.
Schuh, Paul G.,
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Schulze, Louis,
631 S. Patterson Park ave., Baltimore, Md.
Schurk, Louis,
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Schweickhardt, Richard,
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Scott, George T.,
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Scott, J. McDonald,
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Scoville, Wilbur L.,
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Selzer, Eugene R.,
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Sempill, Walter M.,
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Sennewald, Ferdinand W.,
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53 Observatory st., Cincinnati, O.
Sevin, N. Douglas,
141 Main st., Norwich, Conn.
Shafer, Erwin C.,
Green Lane & York Road, Philadelphia, Pa.
Shake, Homer C.,
125 Oliver ave., W. Indianapolis, Ind.
Shannon, Thomas R.,
154 Trumbull st., Hartford, Conn.
Sharp, Alpheus P.,
Pratt & Howard sts., Baltimore, Md.
Sharp, Harry,
Junc. Marietta & Walton sts., Atlanta, Ga.
Sharples, Stephen P.,
13 Broad st,, Boston, Mass.
Shaw, Robert J.,
3 E. Front st., Plainfield, N. J.
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Kansas&Howel av's,Marceline,Linn.co.,Mo.
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1513 Dodge st., Omaha, Neb.
Sherrard, Charles C.,
121 20th st., Detroit, Mich.
Sherwin, Eugene A.,
Ashland, Ore.
Sherwood, Henry J.,
979 Woodland ave., Cleveland, O.
Sherwood, Lewis W.,
45 W. Broad st., Columbus, O.
Shinn, James T.,
Broad & Spruce sts., Philadelphia, Pa.
Shoemaker, Richard M.,
4th & Race sts., Philadelphia, Pa.
Shreve, John A.,
Main st., Port Gibson, Miss.
Shriver, Henry,
53 Baltimore st., Cumberland, Md.
Shryer, Thomas W.,
111 Baltimore st., Cumberland, Md.
Shultz, Merriken E.,
106 N. 5th st., Beatrice, Neb.
Shurtleff, Israel H.,
39 Elm st., New Bedford, Mass.
Siegemund, Charles A.,
38 Pearl st., Boston, Mass.
Siegenthaler, Harvey N.,
22 E. High st., Springfield, O.
Sieker, Ferdinand A.,
128 William st., New York, N. Y.
Siekman, Ivan F.,
75 S. Rampart st., New Orleans, La.
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Simms, Giles G. C.,
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Simon, William,
1348 Block st., Baltimore, Md.
Simons, Arthur H.,
Conneaut, Ashtabula co., O.
Simonson, William,
9th & Race sts., Cincinnati, O.
Simpson, William,
101 Fayetteville st., Raleigh, N.C.
Simpson, William C.,
Vienna, Ill.
Simson, Francis C.,
Pentagon Bdg., Halifax, N. S.
Simson, William A.,
Care Simson Bros. & Co., Halifax, N. S.
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Sloan, George W.,
22 W. Washington st., Indianapolis, Ind.
Slocum, Frank L.,
170 Rebecca st., Allegheny, Pa.
Smink, Robert W,,
309 W. Spruce st., Shamokin, Pa.
Smink, William H. R.,
33 Market st., Shamokin, Pa.
Smith, B. Frank,
2600 Indiana ave., Chicago, Ill.
Smith, Charles B.,
861 Broad st., Newark, N. J.
Smith, Clarence P.,
863 Broad st., Newark, N. J.
Smith, Edward N.,
95 Main st., Thompsonville, Conn.
Smith, Edward S.,
Main st., Port Henry, N. Y.
Smith, Frank R.,
5th & King sts., Wilmington, Del.
Smith, Frank T.,
Franklin, Macon co., N. C.

Smith, George S.,
Liberal, Seward co., Kan.
Smith, James P.,
1776 Broad st., Augusta, Ga.
Smith, Joseph S.,
Akron, O.
Smith, Lauriston S.,
King st., St. Augustine, Fla.
Smith, Linton,
Church & Bennett sts., Wilmington, Del.
Smith, Linville H.,
701 Centre st., Jamaica Plain, Mass.
Smith, Reuben R.,
198 9th ave., New York, N. Y.
Smith, Samuel W.,
182 Main st., Ansonia, New Haven co., Conn.
Smith, Theodric,
1343 Pennsylvania ave., Baltimore, Md.
Smith, Thomas E.,
252 Beauregard st., Mobile, Ala.
Smith, Whitefoord G.,
31 Patton ave., Asheville, N. C.
Smith, Willard A.,
Main st., Richfield Springs, N. Y.
Smith, William C.,
Stockton, Cal.
Smithson, David E.,
Caldwell, Canyon co., Idaho.
Sniteman, Charles C.,
Neillsville, Clark Co., Wis.
Snow, Charles W.,
214 Warren st., Syracuse, N. Y.
Snyder, Alva L.,
33 Court Square, Bryan, O.
Snyder, Ambrose C.,
13½ St. Felix st., Brooklyn, N. Y.
Snyder, Robert J.,
2d & Market sts., Louisville, Ky.
Soetje, Edward C.,
434 South Broadway, South Denver, Colo.
Sohn, Frank,
Grand & Easton aves., St. Louis, Mo.
Sohrbeck, G. Henry,
3d ave. & 16th st., Moline, Ill.
Solomons, Isaiah A.,
Savannah, Ga.
Sombart, John E.,
El Reno, Oklahoma.
Sords, Thomas V.,
315 Pearl st., Cleveland, O.
Spalding, Warren A.,
89 Church st., New Haven, Conn.
Sparks, James M.,
718 Garrison ave., Fort Smith, Ark.
Spengler, John G.,
2d & Webster sts., Dayton, O.
Spenzer, Peter I.,
370 Central ave., Cleveland, O.
Sperry, Herman J.,
151 Chapel st., New Haven, Conn.
Sprague, Wesson G.,
Main st., Flushing, Mich.
Squibb, Edward H.,
36 Doughty st, Brooklyn, N. Y.
Squibb, Edward R.,
36 Doughty st., Brooklyn, N. Y.
Squires, G. Benton,
65 Cambridge st., Boston, Mass.
Stacey, Benjamin F.,
Thompson Square, Charleston, Mass.
Staebler, Richard,
848 Broad st, Newark, N. J.
Stahler, William,
Main & Swede sts., Norristown, Pa.
Stahlhuth, Ernst H. W.,
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Stam, Colin F.,
Chestertown, Kent co., Md.
Stamford, William H.,
256 Mulberry st., Newark, N. J.
Stark, Harry,
2108 Lucas Pl., St. Louis. Mo.
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204 Rodney st., Helena, Mont.
Staudt, Louis C.,
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Stearns, Henry A.,
Care of Fred. Stearns & Co., Detroit, Mich.
Stebbins, Harry F.,
Wilton & 23d sts., Denver, Colo.
Stecher, Henry W.,
1066 Pearl st., Cleveland, O.
Stedhem, Frederick W. E,
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Steele, Geerge R.,
Main & Prospect sts., Thompsonville, Conn.
Steele, James G.,
635 Market st., San Francisco, Cal.
Stein, Jacob H.,
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Steinhauer, Frederick,
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Opp. Post Office, Carson City, Nev.

Stendel, Guthardt,
640 Dryades st., New Orleans, La.
Stevens, Alonzo B.,
15 Church st., Ann Arbor, Mich.
Stevens, Fred. D.,
133 Woodward ave., Detroit, Mich.
Stewart, Francis E.,
Care Fred. Stearns & Co., Detroit, Mich.
Stiles, Justin E.,
22 Broadway, St. Louis Park, Minn.
St. Martin, Theophilus,
Wahoo, Neb.
Stoehr, Julius J.,
King st., Garrett, Ind.
Stoff, Louis,
1180 2d ave., New York, N. Y.
Stong, Franz Sigel,
224 Montgomery ave., Chattanooga, Tenn.
Stoughton, Dwight G.,
204 State st., Hartford, Conn.
Stowell, Daniel,
1045 Washington st., Boston, Mass.
Strathman, Charles A.,
El Paso, Woodford co., Ill.
Stuver, Emanuel,
Rawlins. Wyo.
Summers, James W. F.,
Gould City. Mackinaw co., Mich.
Sumner, Alphonso,
51 Huntington ave., Boston, Mass.
Sweeny, Robert O.,
Duluth, St. Louis co., Minn.
Sweet, Caldwell,
22 W. Market Square, Bangor, Me.
Tailby, Joseph A.,
Linden st., Wellesley, Mass.
Tammen, Geo.,
Main st., Eureka, S. Dak.
Tanke, Ernst J.,
117 Wells st., Chicago, Ill.
Taylor, Alfred B.,
2338 N. 6th st., Philadelphia, Pa.
Taylor, George A.,
42 Railroad st., Methuen, Mass.
Taylor, George E.,
615 Harrison ave., Leadville, Colo.
Taylor, John P.,
99 3d st., New Bedford, Mass.
Taylor, Walter T.,
709 Dauphin st., New Orleans, La.
Thames, Joseph J.,
E. Main st., Taylor, Tex.
Thatcher, Hervey D.,
12 Market Square, Potsdam, N. Y.
Thomas, Oscar E.,
164 Main st., Columbia, S. C.
Thomas, Robert, Jr.,
126 Broadway, Thomasville, Ga.
Thomasson, Anders,
277 Central st., Lowell, Mass.
Thompson, Albert D.,
101 Washington ave. S., Minneapolis, Minn.
Thompson, Frank A.,
559 3d ave., Detroit, Mich.
Thompson, William B.,
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Thompson, William S.,
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16 W. German st., Baltimore, Md.
Thorn, Henry P.,
Main st. Medford, N. J.
Thurston, Azor,
Grand Rapids, Wood co., O.
Tiarks, Hermann,
First st., Monticello, Ia.
Tigner, James O.,
Greenville, Meriwether co., Ga.
Tilden, Amos K.,
31 School st., Boston, Mass.
Tobey, Charles W.,
302 Market st., Troy, O.
Tobin, John M.,
Narragansett Pier, R. I.
Todd, Albert M.,
204 N. Rose st., Kalamazoo, Mich.
Tomfohrde, Charles W.,
1827 Case ave, St. Louis, Mo.
Tomlinson, Burton A.,
care of McPike & Fox, Atchison, Kans.
Topley, James,
166 Georgia st., Vallejo, Solano co., Cal.
Torbert, Willard H.,
756 Main st., Dubuque, Ia.
Townsend, Albert D.,
Randolph, Neb.
Tracy, David W.,
139 Main st., Hartford, Conn.
Trautmann, Ludwig,
Wabasha, Minn.
Travis, Miles B.,
Saybrook, McLean co., Ill.
Treat, Joseph A.,
Stuart, Guthrie co., Ia.

Treherne, John C.,
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Trimble, Henry,
145 N. 10th st., Philadelphia, Pa.
Troppmann, Charles M.,
Merced, Cal.
Truax, Charles,
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Tscheppe, Adolph,
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Tucker, Greenleaf R.,
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Tucker, Mosely F.,
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TUFTS, CHARLES A.,
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Tuma, Bruno,
11 Camp st., New Orleans, La.
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Turner, John P.,
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Turner, T. Larkin,
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Urban, Jacob P.,
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Valliant, George E.,
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Van Antwerp, Andrew,
Dauphin & Royal sts., Mobile, Ala.
Van Antwerp, Garet,
71 Dauphin st., Mobile, Ala.
Van Auken, Jerrie A.,
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Van Winkle, Abraham W.,
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Vargas-Heredia, Jorge,
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Varney, Edward F.,
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Vaughan, Parry W.,
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Vellines, Davies,
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Vernor, James,
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Voge, Richard,
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Voigt, Joseph F.,
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Vonachen, Frank A.,
622 N. Adams st., Peoria, Ill.
Vordick, August H.,
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Voss, George W.,
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Washburn, Harry M.,
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Watson, Herbert K.,
803 Market st., Wilmington, Del.
Watson, Sidney P.,
137 Richardson st., Atlanta, Ga.
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Westmann, Frank H.,
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Westlake, Leonard J.,
194 Main st., Gold Hill, Nev.
Wetherell, Albert S.,
122 Water st., Exeter, N. H.
Wetterstroem, Albert,
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Weyer, John,
Norwood, Hamilton co., O.
Whall, Joseph S.,
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Wheeler, C. Gilbert.
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400 Hayes st., San Francisco, Cal.
White, William H.,
2320 4th st., Meridian, Miss.
WHITFIELD, THOMAS,
240 Wabash ave., Chicago, Ill.
Whiting, J. Fred.,
Main st., Great Barrington, Mass.
Whitman, Nelson S.,
175 Main st., Nashua, N. H.
WHITNEY, HENRY M.,
297 Essex st., Lawrence, Mass.

Wichelns, Frederick,
192 Greenwich st, New York, N. Y.
Wickham, William H.,
91 Fulton st., New York, N. Y.
Wiegand, Thomas S.,
145 N. 10th st., Philadelphia, Pa.
Wienges, Conrad,
489 Jersey ave., Jersey City, N. J.
Wilcox, Frederick,
Apothecaries' Hall, Waterbury, Conn.
Wilder, George P.,
N. Park st., Lebanon, N. H.
Wilhite, Frank T.,
39 Public Square, Anderson, S. C.
Willett, G. Howard,
725 Main st., Kansas City, Mo.
Williams, Charles F.,
Main st., Thomaston, Conn.
Williams, Duane B.,
16 Lincoln Square, Worcester, Mass.
Williams, Edward M.,
Myers, Lee co., Fla.
Williams, George G.,
P. O. Box 3551, Boston, Mass.
Williams, John K.,
391 Main st., Hartford, Conn.
Williams, Richard W.,
Notre Dame st., Three Rivers, Quebec, Can.
Williams, Seward W.,
8 Brighton ave., East Orange, N. J.
Williams, William H.,
659 Main st., Wheeling, W. Va.
Wills, Fred. M.,
323 Main st., Charlottesville, Va.
Wilson, Benjamin O.,
28 Merchants' Row, Boston, Mass.
Wilson, Charles F.,
11th & Auburn st., St. Louis, Mo.
Wilson, Frank M.,
133 Main st., Willimantic, Conn.
Wilson, William,
86 Broadway, New York, N. Y.
WINKELMANN, JOHN H.,
31 Hopkins Place, Baltimore, Md.
Winnberg, John M.,
200 Main st., Jamestown, N. Y.
WINTER, JONAS,
202 Prospect st., Hagerstown, Md.
Winters, Aaron,
75 N. Second st., Ironton, O.
Winters, John H.,
New Canaan, Conn.
WOLTERSDORF, LOUIS,
171 Blue Island ave., Chicago, Ill.
Wood, Alonzo F., Jr.,
2 Church st., New Haven, Conn.
Wood, Edward S.,
688 Boylston st., Boston, Mass.
Wood, George M.,
20 Broad st., Bloomfield, N. J.
Wood, James P.,
2 Church st., New Haven, Conn.
Wood, Mason B.,
P. O. Box 58, East Providence, R. I.
Woodman, Walter I.,
St. Augustine, Fla.
Woodruff, Roderick S.,
102 Prospect st., Waterbury, Conn.
Woods, George D.,
1721 Evans st., Cheyenne, Wyo.
Woods, Silas E.,
Jackson, Mo.
Woodward, Brinton W.,
Lawrence, Kans.
Woolridge, Daniel T.,
9 Morgan st., Boonville, Mo.
Woolley, Stephen D.,
Asbury Park, N. J.
Wooten, Thomas V.,
943 W. Madison st., Chicago, Ill.
Wray, George B.,
P. O. Box 721, Yonkers, N. Y.
Wright, Arthur W.,
44 New st., Newark, N. J.
Wulling, Frederick J.,
Minn. University, Minneapolis, Minn.
Wunderlich, Edward,
1415 Dryades st., New Orleans, La.
Wurmb, Theodore H.,
1923 E. Grand ave., St. Louis, Mo.
Wychoff, Elmer E.,
2409 7th ave., Rock Island, Ill.
Yearby, William M.,
123 E. Main st., Durham, N. C.
YORSTON, MATTHEW M.,
429 Central ave., Cincinnati, O.
Young, Hiram W.,
Main st., Marion, Kans.
Young, John K.,
P. O. Box 235, Bristol, Pa.
Young, William,
114 Park ave., Rich Hill, Mo.
Zahm, Emil A.,
1801 State st., Chicago, Ill.

Zeilin, J. Henry,
306 Cherry st., Philadelphia, Pa.
Zellhoefer, George,
1044 Broadway, Brooklyn, N. Y.
Ziegler, Philip M.,
526 Penn st., Reading, Pa.
Zimmer, Harry E.,
78 E. Washington, st., Indianapolis, Ind.
Zimmerman, Albert,
2113 S. Adams st., Peoria, Ill.
Zimmerman, Bernard,
45 E. 4th st., St. Paul, Minn.
Zimmerman, Charles,
105 2d ave., Peoria, Ill.
Zoeller, Edward V.,
Main st., Tarboro, N. C.
Zuenkeler, J. Ferd.,
686 Vine st., Cincinnati, O.
Zwick, George A.,
11th st. & Madison ave., Covington, Ky.

LIST OF RESIGNATIONS.

Appel, Franklin M.
Armor, Alpheus.
Aspinall, Walter A.
Beach, Clifton H.
Brand, Erich.
Eimer, Chas.
Glines, George W.
Hadley, Frank B.
Hanenkratt, Diebold V.
Hardison, James A.
Hart, Gilbreath N.
Heimstreet, Edward B.
Hodgkins, Bert W.
Jenkins, Luther L.
Krebs, Carl.
Meissner, Paul E.
Metzger, George F.
More, Arthur F.
Powell, Robert B.
Seitz, Oscar.
Sippy, Alvin H.
Smith, J. Hungerford.
Snow, Herbert W.
Stanley, Edgar C.
Tartiss, Alfred J.

LIST OF DECEASED MEMBERS.

Ahlbrandt, Henry F.,	St. Louis, Mo.,	Elected 1877
Baxley, J. Brown,	Baltimore, Md.,	" 1856
Bell, John I.,	Chicago, Ill.,	" 1890
Bocking, Edmund,	Wheeling, W. Va.,	" 1874
Haenchen, Chas. E.,	Philadelphia, Pa.,	" 1865
Jones, Edw. C.,	Media, Pa.,	" 1864
Jones, John, Jr.,	Gold Hill, Nevada,	" 1889
Kendrick, Harlan Page,	Barre, Vermont,	" 1894
Kessler, Edw. F.,	Louisville, Ky.,	" 1879
Mattingly, Geo. J.,	New Orleans, La.,	" 1891
Milburn, Jno. A.,	Washington, D. C.,	" 1858
Munson, Luzerne I.,	Waterbury, Conn.,	" 1872
Rust, William,	New Brunswick, N. J.,	" 1870
Whiting, Frederick T.,	Great Barrington, Mass.,	" 1863

LIST OF MEMBERS DROPPED FROM THE ROLL FOR NON-PAYMENT OF DUES, ACCORDING TO CHAPTER VII., ARTICLE III., OF THE BY-LAWS.

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Albrecht, Joseph.
Anderson, Finis L.
Baier, Chas. G.
Baker, Frederick W. R.
Beardsley, Joseph L.
Bogel, Wm. G. H.
Bossidy, Bartholomew.
Bowker, Everett F.
Brandon, Cole W.
Broadus, T. Madison.
Burghardt, Geo. H.
Carrol, Edward.
Chapin, Henry A.
Chase, Walter H.
Cummings, Theodore F.
Desmond, Edward.
Dittmer, Chas. L.
Dufault, Hilaire.
Eaton, John M.
Ebbitt, Wm. H.
Fahey, Edward F.
Farrell, Thomas H.
Fetterman, Thomas M.
Fischer, Henry J.
Fischer, Phil.
Ford, Herbert L.
Ford, W. Thomas.
Frere, Alexander G.
Frost, Louis E.
Fruh, Carl D. S.
Gordon, Richard H.
Groetsch, Geo. W.
Gutierrez, Antonio G.
Hall, Chas. E.
Halleck, Wm. E.
Hanson, Arthur E.
Harris, Chester C.
Hays, B. Frank.
Hays, David.
Helmann, Otto.
Hoenny, Adolph J.
Hynard, Eugene R.
Inglis, Frank.
Jackson, Edward C.
James, Frank L.
Johnson, Arthur S.
Johnston, Wm., Jr.
Kadec, Lawrence W.
Kearfott, Clarence P.
Keil, Fred C.
Lauer, Michael J.
Lightstone, William H.
Lockhart, George B.
Loveland, Chas. H.
Macmahan, Thomas J.
Macmillan, Andrew J.
Maghee, Thomas G.
Martin, Robert R.
Mayer, John F.
Miller, Joseph G.
Myhre, Olaus G.
Powell, Thomas W.
Raynale, Frank B.
Reichardt, T. Alfred.
Riggs, William E.
Robin, Oscar.
Ross, Samuel P.
Schotel, John C.
Scott, Frank G.
Shelton, William C.
Spangler, Henry W.
Taylor, Thomas L.
Thurber, Almon R.
Travis, T. Walton.
Trudel, Jacques J.
Wakefield, Seth D.
Walker, Chas. W.
Watson, Wm. S.
Wight, Oscar M.
Williams, Benjamin C.
Wolfe, Nathaniel.
Wright, Albert F.
Yocum, Albert L.

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THE

NATIONAL FORMULARY

OF

UNOFFICIAL PREPARATIONS.

REVISED EDITION.

BY AUTHORITY OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

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PREFACE TO THE REVISED EDITION.

When the present Committee on National Formulary was appointed in 1888, the "Formulary" had just been issued, and embraced practically all preparations in established use for which no uniform or authoritative standard existed. The work was as nearly perfect as could be expected, but it was not to be supposed that so large a number of formulas as are embraced by the "Formulary" should prove uniformly satisfactory. As a matter of fact, the most frequent complaints that reached the Committee were made with reference to the imperfection—real or supposed—of certain formulas. These complaints have been carefully considered, and the necessary corrections have been made in all cases in which the complaints were found to be just.

Another source of complaint that finds voice quite frequently is that too many of the preparations are dependent upon each other; that is to say, that in order to make one preparation, two, three or more other preparations have to be made before the one desired can be compounded. This defect is true only in a restricted sense, and does not entail the inconvenience that is generally implied in the complaints. As already pointed out in the preface to the original edition (p. v.) only a few preparations of the "Formulary" are so concerned, and these are inexpensive, and are easily kept in a well assorted stock. It is, therefore, suggested that the following preparations be kept ready prepared:

Aromatic Elixir (U. S. P.).
Aromatic Elixir of Liquorice (F. 77).
Compound Elixir of Taraxacum (F. 111).
Compound Spirit of Orange (U. S. P.).
Compound Spirit of Cardamon (F. 347).
Compound Tincture of Cudbear (F. 419).
Solution of Cochineal (F. 216).

Syrup of Coffee (F. 367).

Tincture of Citro-Chloride of Iron (F. 407).

Tincture of Cudbear (F. 418).

With these preparations—which cannot be made at short notice—and such chemicals and supplies as may be expected in every well-appointed pharmacy, most of the preparations contemplated in the complaints may be conveniently and expeditiously made; while in the case of formulas in which other preparations of the "Formulary" are concerned, their preparation can usually become part of the process. To facilitate this the number as well as the name of the preparation so directed is given in the formulas, while official preparations are indicated by the letters "U. S. P." following their titles.

The demand for additional formulas has been carefully considered by the Committee. This demand, unfortunately, was in most cases for working formulas for preparations that have come into current use under fanciful trade-names, and for which no formulas, other than obscure indications of composition borne on the labels, are known to pharmacy. The Committee did not consider it within the scope of their duties to devise and construct formulas for such preparations, the more particularly since their composition is only imperfectly given, and because the demand for them seems to be dependent upon the skill and industry with which they are brought to the attention of the medical profession, rather than upon any intrinsic superiority that they possess over other medicinal agents. On the other hand, preparations for which working formulas were suggested to the Committee, were uniformly subjected to critical experiment, and their formulas embodied in the revised "Formulary."

The Committee has seen fit to embody in this revised edition the formulas of such preparations as were dropped at the last revision of the U. S. Pharmacopœia, since some of these may still continue to be prescribed in various parts of the country; on the other hand, the formulas for all those preparations have been omitted, which appeared in the first edition of the "Formulary," but were subsequently introduced into the Pharmacopœia of 1890.

In conformity with instruction the different denominations of weights and measures are expressed in the terms of the Metric System in this revised "Formulary," and they have been adjusted, when-

ever practicable, so as to make one thousand grammes or cubic centimeters of the finished product. This is perhaps the most radical change that has been effected, but one that places the "Formulary" abreast of the times, and its text in harmony with that of the U. S. Pharmacopœia of 1890.

C. Lewis Diehl,
Chairman of the Com. on Nat. Formulary of the A. Ph. A.

A. B. Stevens,
Chairman of the Sub-Committee on Corrections.

C. T. P. Fennel,
Chairman of the Sub-Committee on Eliminations.

Chas. Caspari, Jr.,
Chairman of the Sub-Committee on Additions.

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PREFACE TO THE FIRST EDITION.

It is well known that the remedies for which the Pharmacopœia prescribes definite standards, constitute only a limited portion of the resources of the medical profession in the treatment of the sick. Without referring to the more ephemeral preparations, or to such as are of a proprietary character, or are used by the public for self-medication, there is a large number of others, which are more or less frequently prescribed by physicians, or demanded by the public, but which are not recognized by the Pharmacopœia, either because they were not deemed by the revisers to be of sufficient importance to be included in the official work, or because they originated subsequently to the appearance of that work, or for other reasons. Owing to the absence of an authoritative standard, many of these unofficial preparations have been, and are being made, after different formulæ, and in varying strength, so that the pharmacists, particularly in the larger cities, are compelled to procure and keep on hand a variety of brands of what is intended to be one and the same preparation, to satisfy the demands of their patrons, professional or otherwise. The evils arising from this condition of things are so well known and so far-reaching in their results, that there is no need of any argument in favor of a plan which may palliate the existing evil, chiefly caused by a lack of uniformity, or the want of a common standard.

In order to bring about a practical amelioration of this state of things, a local Committee representing the College of Pharmacy of the City of New York, the Kings County Pharmaceutical Society of Brooklyn, and the German Apothecaries' Society of the City of New York, several years ago published a book of formulæ, comprising those which were in most frequent use in their immediate vicinity, and recommended the same to the medical profession. As this book appeared at a time which happened to be particularly favorable to the realization of the object sought to be attained, it gained so much ground, even outside of the locality for which it was originally intended, that the Joint Committee, authorized by the Societies which it represented, tendered the work to the American Pharmaceutical

Association, at the Annual Meeting held at Pittsburgh, in 1885, as a nucleus for the construction of a National Formulary. The Association having accepted the gift, a Committee was appointed to prepare such a work, and as a first result, this Committee presented at the next Annual Meeting, held at Providence, in 1886, a "*Preliminary Draft of a National Formulary*," comprising whatever the Committee had been able to gather, either from existing formularies, or from its own labors, or from the special contributions of individuals or societies. This Draft showed, more forcibly than could have been done in any other manner, how serious the existing evil was, and at the same time, how difficult would be the task to bring into harmony the conflicting views and customs. For the purpose of enabling the Committee to accomplish this task with better expectation of success, it was enlarged by the addition of one member from every State Pharmaceutical Association in the United States and Canada.

The Committee thus constituted has endeavored, to the best of its ability, to carry out the object for which it was appointed. While it was, of course, impossible for most of the members representing other States, personally to attend the weekly meetings of the Committee, held in New York City, yet all important matters were referred to them by circular, and their votes thereon solicited, so that the results, regarded as a whole, truly represent the intentions and decisions of the whole Committee, though individual members may not have agreed upon every detail.

One of the most difficult problems which the Committee encountered, was the selection of the preparations which should be admitted into the Formulary. In order to ascertain the wishes of the different sections of the country, a printed list of the proposed titles was sent to each member, and a vote or expression of opinion thereon asked for. After all the votes had been returned, it was evident that much would still be left to the discretion of the Editing Sub-Committee, which had in the meantime been appointed. The latter, thereupon, prepared a final list of titles, which was again submitted to the members, and this list having been slightly amended in accordance with the suggestions received, was made the basis of the final text, though in the course of editing some further changes, chiefly additions, became necessary in order to fill in existing gaps. On looking over the contents of the book, every individual reader will probably encounter quite a number of preparations with which he is unfamiliar, or which he has never had occasion to use or to dispense, and the presence of which, from his standpoint, may appear superfluous. It should, however, be remembered that every section of this large country had to be considered: hence, what may be entirely unused or only rarely used in one section, may be of common

occurrence in another. It is quite probable that some preparations which ought to have been received into the Formulary have been overlooked, or that some of those introduced are not as frequently employed as has been represented to the Committee. Whatever error may have been committed in one direction or another, will no doubt be corrected in subsequent editions.

While it was at no time contemplated by the Committee as a whole—though, perhaps, by some individual members—to devise imitations of any of the popular nostrums of the present day, yet it was very difficult to decide exactly where the line should be drawn. Consequently the list will be found to include a small number of formulæ which may recall some of the before-mentioned preparations, but which are constructed on rational principles, irrespective of mere external appearance and taste, and mainly with regard to uniform composition and reliable effect. It is not expected that these preparations will readily replace, in the eyes of the public, the much-advertised nostrums, but it is hoped that if proper therapeutic effects are expected from them, they will be used or directed to be used in place of the commercial articles, the composition of which is generally kept secret. A proposition was at one time made to include in the work definitions and descriptions of the more important crude drugs and chemicals which have come into use since the last U. S. Pharmacopœia was issued. But it was found that the labor involved in the task already outlined was so great, that no time could be devoted to any further additions. Hence the project had to be abandoned, though it will be a comparatively easy matter to incorporate these additions in a subsequent edition.

In constructing the formulæ of the compound preparations, it has been the endeavor of the Committee to make them as independent from each other as possible, so that only a comparatively small number of what may be called *basic preparations* need be kept in stock. The principal bases thus required are:

No. 25. Elixir Adjuvans. As a vehicle, chiefly for saline preparations.—No. 31. Aromatic Elixir. Intended to be used as a substitute for the officinal Elixir Aurantii, unless the latter or some other flavored Elixir should be preferred.—No. 42. Elixir of Cinchona.—No. 44. Detannated Elixir of Cinchona.—No. 54. Elixir of Yerba Santa.—No. 81. Elixir of Pepsin.—No. 105. Compound Elixir of Taraxacum.—No. 337. Aromatic Spirit.—No. 338. Compound Spirit of Orange.—No. 340. Spirit of Curacao.—No. 352. Syrup of Coffee.—No. 360. Aromatic Syrup of Yerba Santa.—No. 394. Detannated Tincture of Cinchona.—If these are kept in stock in reasonable quantities, most of the compound preparations contained in the Formulary may be prepared in a short time.

Regarding the system of weights and measures used in the work, the probable action of the Committee had been foreshadowed in their last Report to the American Pharmaceutical Association, in which they expressed their conviction that all medicines that are prescribed by *measure*, had better be prepared by measure, or by weight *and* measure. The Committee is of the opinion that the working formulæ, either in a Pharmacopœia or in a Formulary, need not all be forced into one rigid, immutable, and uniform system of weights or of measures; but that a judicious and common-sense selection of one or another system, in different formulæ of the same work, may be perfectly legitimate, so long as those used in one and the same formula are practically commensurate with each other—the object, in all cases, being to obtain uniform and definite products, the relative strength of which will be immediately understood without special calculations. While, therefore, the system of *parts by weight* has been unreservedly admitted in the case of such preparations as are always, or at least preferably, made by weight (for instance, No. 2, Acidum Carbolicum Iodatum; No. 10, Boroglycerinum, etc., etc.), definite weights and measures have been used in the case of all those which are taken or administered by measure.

In the choice of the terms expressing the different denominations of weights and measures, some variation will be noticed, which is, however, introduced designedly. For instance, in No. 197 (Linimentum Opii Compositum), the first item is 1½ fluidounces; the second, 120 grains; the third, 4 fluidounces; the fourth, 180 minims; the fifth, 6 fluidounces, etc. The term "180 minims" was preferred to "3 fluidrachms," to break the monotony of the *fluid* terms, so as to diminish the risk of a mistake. And this method has been applied also in many other cases.

Regarding the nomenclature, the Committee has selected what appeared to them the most suitable and expressive titles. Probably many of the preparations in the work will never be ordered under their Latin names, as for instance, "Pulvis Hydrargyri Chloridi Mitis et Jalapæ" ("Calomel and Jalap"); yet it was deemed necessary to introduce such titles, in order to secure a homogeneous alphabetical arrangement.

In the selection of the particular process or working formula for each preparation, the Committee has proceeded with all the care that it was possible to bestow upon it. All suggestions, recommendations and criticisms were carefully and impartially considered, and, whenever possible, practically tested. It is not to be expected, however, that the Committee has always succeeded in making the best selection. Indeed, many of the formulæ will, no doubt, hereafter, require modification to make them more perfect, after a suf-

ficient time has elapsed to fully test the merits of the different processes.

It was not within the province of the Committee to meddle with matters of which the medical practitioner or the therapeutist is the proper and competent judge. In most cases, it was sufficient to take a formula, just as it was already in existence, and to adopt it either entirely without change, or to restrict the modifications to the unessential features without affecting its therapeutic value, and merely with a view to improve its form. There are, however, a number of preparations in which more radical changes appeared desirable. In these cases the Committee availed itself of the advice of competent medical authorities, either by personal interviews or by correspondence.

The mission which this work is to fulfil can only be properly accomplished by the co-operation of the medical profession. It is, therefore, of the greatest importance that the members of this profession, throughout the country, be made acquainted with the existence, contents and objects of this book, and that, if the same be approved by them, as is confidently expected, they will consent to accept the preparations made in accordance with the formulæ contained therein, instead of designating any special maker's product.

In the execution of its task, the National Committee has been fortunate enough to avail itself of valuable advice and assistance, both voluntary and solicited, from many members of the profession and other sources. At the request of the Committee, the three Societies who had issued the pamphlet above spoken of, continued the several committees formerly appointed by them, and this increase of the working nucleus of the National Committee has been of the utmost importance to a successful termination of its allotted task, since without this assistance, it would have been physically impossible for it to perform the large number of experiments, and to prepare the many hundreds of specimens, necessary to decide on the merits of the various proposed formulæ. The gentlemen who have so generously assisted the Committee, and to whom special thanks are due, are: Messrs. Gustavus Balser, Julius Kalish, Edward L. Milhau, and Henry Schmid, from the College of Pharmacy of the City of New York; Messrs. Donald L. Cameron, Thomas D. McElhenie, J. P. Heyen, Louis E. Nicot, and Charles R. Paddock, of the Kings County Pharmaceutical Society; and Messrs. Theodore Louis, Charles E. P. Meumann, Gustavus Pfingsten, Gustavus Ramsperger, and Charles F. Schleussner, of the German Apothecaries' Society of the City of New York. Very valuable assistance has also been rendered to the Committee by the following gentlemen: Prof. Joseph P. Remington, Prof. J. M. Maisch, and Mr. Alfred B. Taylor, of Philadelphia; Prof. J. U.

Lloyd, of Cincinnati; Dr. Robert G. Eccles, of Brooklyn; Prof. Charles E. Munroe, U. S. N., of Newport, R. I.; Prof. Alfred M. Mayer, of Hoboken, N. J.; Messrs. Charles F. Heebner, W. M. Massey, and B. T. Fairchild, of New York; Mr. O. A. A. Rouillion, of Brooklyn; Mr. C. H. Bernhard, of Madison; and Mr. A. Conrath, of Milwaukee, Wis.; Dr. Charles Mohr, of Mobile, Ala.; Mr. J. H. Dawson, and Prof. W. T. Wenzell, of San Francisco; Messrs. R. B. Ferguson, W. S. Thompson, and G. G. C. Simms, of Washington, D. C.; Dr. A. B. Lyons, of Detroit, Mich.; Messrs. S. A. D. Sheppard, and J. W. Colcord, of Boston, Mass.; Mr. J. D. A. Hartz, of College Point, N. Y.; Mr. Albert E. Ebert, Prof. E. B. Stuart and Mr. Charles L. Feldkamp, of Chicago, Ill.; the Committee on Unofficinal Formulæ appointed by various State Pharmaceutical Associations during the last two years, and many others.

The Committee, on behalf of the American Pharmaceutical Association, now turns over its work to the public, and expresses the hope that it will be accepted as a standard and guide, whenever possible. In order that it may be rendered more perfect and complete, it is respectfully urged that any defects, omissions, or errors, be carefully noted, and that a list of these, as well as suggestions and propositions for a future revision, be sent to the Secretary of the American Pharmaceutical Association, or to any Formulary Committee that may hereafter be appointed.

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NATIONAL FORMULARY

OF

UNOFFICIAL PREPARATIONS.

1. ACETUM AROMATICUM.

Aromatic Vinegar.

Oil of Lavender, *one-half cubic centimeter*	0.5 Cc.
Oil of Rosemary, *one-half cubic centimeter*	0.5 Cc.
Oil of Juniper, *one-half cubic centimeter*	0.5 Cc.
Oil of Peppermint, *one-half cubic centimeter*	0.5 Cc.
Oil of Cinnamon (Cassia), *one-half cubic centimeter*	0.5 Cc.
Oil of Lemon, *one cubic centimeter*	1 Cc.
Oil of Cloves, *one cubic centimeter*	1 Cc.
Alcohol, *one hundred and seventy-five cubic centimeters*	175 Cc.
Acetic Acid (U. S. P.), *one hundred and seventy-five cubic centimeters*	175 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Oils in the Alcohol, add the Acetic Acid, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters*. Warm the turbid mixture, during several hours, at a temperature not exceeding 70° C. (158° F.), taking care that it shall not suffer loss by evaporation. Then set it aside for a few days, occasionally agitating, and filter.

2. ACETUM LOBELIÆ.

(U. S. P., 1880).

Vinegar of Lobelia.

Lobelia, in No. 30 powder, *one hundred grammes*	100 Gm.
Diluted Acetic Acid (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Moisten the powder with *fifty* (50) *cubic centimeters* of Diluted Acetic Acid, pack it firmly in a conical glass percolator, and gradually pour Diluted Acetic Acid upon it until *one thousand* (1000) *cubic centimeters* of percolate are obtained.

3. ACETUM SANGUINARIÆ.

(U. S. P., 1880).

Vinegar of Sanguinaria.

Sanguinaria, in No. 30 powder, *one hundred grammes*	100 Gm.
Diluted Acetic Acid (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Moisten the powder with *fifty* (50) *cubic centimeters* of Diluted Acetic Acid, pack it firmly in a conical glass percolator, and gradually pour Diluted Acetic Acid upon it until *one thousand* (1000) *cubic centimeters* of percolate are obtained.

4. ACIDUM CARBOLICUM IODATUM.

Iodized Carbolic Acid.

Phenol Iodatum. Iodized Phenol.

Iodine, reduced to powder, *twenty grammes*	20 Gm.
Carbolic Acid, *sixty grammes*	60 Gm.
Glycerin, *twenty grammes*	20 Gm.

Introduce the Iodine into a flask, add the Carbolic Acid, previously melted, then the Glycerin, and digest the mixture at a gentle heat, frequently agitating, until the Iodine is dissolved.

Keep the product in glass-stoppered vials, in a dark place.

5. ACIDUM CITRICUM SACCHARATUM.

Saccharated Citric Acid.

Citric Acid (U. S. P.), in very fine powder, *six hundred and twenty-five grammes*	625 Gm.
Sugar, in very fine powder, *three hundred and seventy-five grammes*	375 Gm.

Triturate the powders together until intimately mixed, and preserve the product in well-stoppered bottles.

Note.—This Saccharate, when dissolved in water with an equal weight of Saccharated Sodium Bicarbonate (F. 341), will form a neutral solution, and it is introduced into this Formulary for the convenient preparation of Effervescent Powders (F. 319).

This Saccharate contains 62.5 per cent. of Crystallized Citric Acid.

6. ACIDUM HYPOPHOSPHOROSUM DILUTUM.

Diluted Hypophosphorous Acid.

Potassium Hypophosphite, *two hundred and eight grammes.*	208 Gm.
Tartaric Acid, *three hundred grammes*	300 Gm.
Distilled Water, *five hundred and eighty-eight grammes* . . .	588 Gm.
Diluted Alcohol (U. S. P.), *six hundred grammes*	600 Gm.

Dissolve the Potassium Hypophosphite in the Distilled Water,

and the Tartaric Acid in the Diluted Alcohol. Mix the two solutions in a flask, cork the latter well, and put it aside in a cold place during twelve hours. Then carefully decant the liquid into a funnel, the neck of which contains a pellet of absorbent cotton, or, if necessary, pass the liquid through a filter, care being taken that it shall not suffer loss by evaporation. Weigh the filtrate, which contains *ten* (10) *per cent.* of hypophosphorous acid, in a tared capsule, and evaporate the alcohol by means of a water-bath, at a temperature not exceeding 60° C. (140° F.). Then allow the liquid to cool, and add enough Distilled Water to restore the original weight of the filtrate. Preserve the product in well-stoppered bottles.

Note.—This acid is now official in the U. S. P.; but the formula is retained because it may be now and then convenient or necessary to make it. If a 50 per cent. acid is required, the concentration may be cautiously continued until the desired percentage has been attained. A 50 per cent. acid has a specific gravity of about 1.406 at 15° C. (59° F.).

7. ACIDUM METAPHOSPHORICUM DILUTUM.

Diluted Metaphosphoric Acid.

Acidum Phosphoricum Glaciale Dilutum. Diluted Glacial Phosphoric Acid.

Glacial Phosphoric Acid, *one hundred grammes* . . . . . **100 Gm.**
Distilled Water, *enough to make one thousand cubic centimeters.* **1000 Cc.**

Dissolve the Acid in the Water, without heat.

This preparation should be kept in a cool and dark place, and should not be prepared in larger quantity than may be consumed within a few months.

Note.—The resulting product contains about 10 per cent. of metaphosphoric acid, provided the glacial acid was free from impurities. That which is sold in form of glassy lumps is usually of sufficient purity. The variety in form of round sticks is more or less impure, containing generally more than 15 per cent. of phosphate of sodium. If this variety is alone available, a proportionately larger quantity must be taken, to be determined, if time permits, by an assay of the free acid present. If no special accuracy is required, about 115 Gm. of this variety of the acid may be reckoned to be equivalent to the quantity directed in the above given formula.

Whenever Pyrophosphate of Iron (U. S. P.) forms one of the ingredients of a mixture containing Diluted Phosphoric Acid, the official tribasic acid is unsuitable, as it produces with the salt a gelatinous precipitate. If a clear mixture is required, the above preparation is to be used in place of the official. The same may be done when Phosphate of Iron (U. S. P.) is prescribed, though the precipitate caused by the official acid in this case is not as bulky, and under certain conditions may not form at all.

8. ACIDIUM TARTARICUM SACCHARATUM.

Saccharated Tartaric Acid.

Tartaric Acid (U. S. P.), in very fine powder, *six hundred and seventy-five grammes* . . . . . 675 Gm.
Sugar, in very fine powder, *three hundred and twenty-five grammes* . . . . . 325 Gm.

Triturate the powders together until intimately mixed, and preserve the product in well-stoppered bottles.

Note.—This Saccharate, when dissolved in water with an equal weight of Saccharated Sodium Bicarbonate (F. 341), will form a neutral solution, and it is introduced into the Formulary for the convenient preparation of Effervescent Powders (F. 319).

This Saccharate contains 67.5 per cent. of Tartaric Acid.

9. AMYLUM IODATUM.

(U. S. P., 1880).

Iodized Starch.

Starch, *ninety-five grammes* . . . . . 95 Gm.
Iodine, *five grammes* . . . . . 5 Gm.
Distilled Water . . . . . a sufficient quantity.

Triturate the Iodine with a little Distilled Water; add the Starch gradually and continue triturating until the compound assumes a uniform blue color, approaching to black. Dry it at a temperature not exceeding 40° C. (104° F.), and rub it to a fine powder.

Iodized Starch should be preserved in glass-stoppered vials.

10. AQUA HAMAMELIDIS SPIRITUOSA.

Hamamelis Water.

Witchhazel Water. Witchhazel Extract.

Hamamelis, shoots and twigs, *ten thousand grammes* . . . . . 10,000 Gm.
Water, *twenty thousand cubic centimeters* . . . . . 20,000 Cc.
Alcohol, *fifteen hundred cubic centimeters* . . . . . 1,500 Cc.

Place the Hamamelis in a still, add the Water and Alcohol, and allow the mixture to macerate during twenty-four hours. Distil *ten thousand* (10,000) *cubic centimeters* by applying direct heat, or preferably, by means of steam.

Note.—This preparation should be made only from the fresh young twigs of Hamamelis, which are collected for this purpose preferably, when the plant is in flower, in the late autumn of the year.

11. AQUA SEDATIVA.

Sedative Water.

Lotio Ammoniacalis Camphorata (Codex). *Eau Sédative de Raspail.*

Water of Ammonia (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Spirit of Camphor (U. S. P.), *twelve cubic centimeters*	12 Cc.
Sodium Chloride, *sixty-five grammes*	65 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Sodium Chloride in about *five hundred* (500) *cubic centimeters* of Water, add the Water of Ammonia and Spirit of Camphor, and finally enough Water to make *one thousand* (1000) *cubic centimeters.*

Shake the liquid when it is to be dispensed.

12. BALSAMUM TRAUMATICUM.

Traumatic Balsam.

Turlington's Balsam. Friar's Balsam.

Benzoin, in coarse powder, *one hundred grammes*	100 Gm.
Storax, *thirty-five grammes*	35 Gm.
Balsam of Tolu, *thirty-five grammes*	35 Gm.
Balsam of Peru, *sixteen grammes*	16 Gm.
Aloes, in coarse powder, *eight grammes*	8 Gm.
Myrrh, in coarse powder, *eight grammes*	8 Gm.
Angelica Root, in moderately coarse powder, *four grammes*	4 Gm.
Alcohol, *one thousand cubic centimeters*	1000 Cc.

Macerate the substances with the Alcohol during ten days, frequently agitating; then filter.

Note.—The official *Tinctura Benzoini Composita* is a simplified preparation intended to replace the above compound.

13. BISMUTHI OXIDUM HYDRATUM.

Hydrated Oxide of Bismuth.

Bismuth Subnitrate, *three hundred grammes*	300 Gm.
Nitric Acid (U. S. P.), *five hundred grammes*	500 Gm.
Water of Ammonia (U. S. P.), *six hundred grammes*	600 Gm.
Sodium Bicarbonate, *fifty grammes*	50 Gm.
Distilled Water	a sufficient quantity.

Mix the Bismuth Subnitrate with *two hundred* (200) *cubic centimeters* of Distilled Water in a quart flask, add *four hundred and fifty* (450) *cubic centimeters* of Nitric Acid, and promote the solution of the salt by agitation, and, if necessary, by a gentle heat. Pour the solution into *six thousand* (6000) *cubic centimeters* of Distilled Water previously acidulated with *fifty* (50) *grammes* of Nitric Acid, and filter the

liquid through absorbent cotton. Mix the Water of Ammonia with *twelve thousand* (12,000) *cubic centimeters* of Distilled Water in a glazed vessel of double that capacity, and pour into it, slowly and with constant stirring, the bismuth solution. Let the mixture stand during four hours so that the precipitate may subside, then pour off the supernatant liquid, and wash the precipitate four times more by decantation with Distilled Water, the Sodium Bicarbonate being dissolved in the last wash-water. Pour the precipitate upon a wetted muslin strainer, and wash it with Distilled Water, until the washings run off tasteless. Transfer the strainer to a warm place, so that the precipitate may dry. Then rub the latter to powder, and keep it in well-stoppered bottles.

Note.—Hydrated Oxide of Bismuth is sometimes demanded in the form of a creamy mixture with water, under the name of *Cremor Bismuthi* or *Cream of Bismuth*. This may be prepared by triturating 20 parts of the Oxide with 80 parts of Water.

14. BOROGLYCERINUM.

Boroglycerin.

Glyceryl Borate. Boroglyceride.

Boric Acid, in powder, *six hundred and twenty grammes* . . .	**620 Gm.**
Glycerin, *nine hundred and twenty grammes*	**920 Gm.**

Heat the Glycerin in a tared porcelain capsule to a temperature not exceeding 150° C. (302° F.), and add the Boric Acid in portions, constantly stirring. When all is added and dissolved, continue the heat at the same temperature, frequently stirring, and breaking up the film which forms on the surface. When the mixture has become reduced to a weight of *one thousand* (1000) *grammes*, pour it out on a flat surface previously coated with a very small quantity of petrolatum, let it cool, cut it into pieces and transfer them immediately to bottles or jars, which should be well-stoppered.

Note.—The official Glycerite of Boroglycerin may be made from this by adding an equal weight of Glycerin to the finished Boroglycerin while it is still warm.

15. CAFFEINÆ SODIO-BENZOAS.

Caffeine Sodio-Benzoate.

Caffeine, *fifty grammes*	**50 Gm.**
Sodium Benzoate, *fifty grammes*	**50 Gm.**
Alcohol	**a sufficient quantity.**

Triturate the Caffeine with the Sodium Benzoate and a sufficient quantity of Alcohol to a smooth paste, and dry this by exposure in a moderately warm place. Rub the dry mass to powder, and keep it in well-stoppered bottles.

Note.—The product contains 50 per cent. of Caffeine, and is soluble in 2 parts of water.

16. CAFFEINÆ SODIO-SALICYLAS.

Caffeine Sodio-Salicylate.

Caffeine, *fifty grammes*	50 Gm.
Sodium Salicylate, *fifty grammes*	50 Gm.
Alcohol	a sufficient quantity.

Triturate the Caffeine with the Sodium Salicylate and a sufficient quantity of Alcohol to a smooth paste, and dry this by exposure in a moderately warm place. Rub the dry mass to powder, and keep it in well-stoppered bottles.

Note.—The product contains 50 per cent. of Caffeine, and is soluble in 2 parts of water.

17. CARBASUS CARBOLATA.

Carbolized Gauze.

Resin, in coarse powder, *forty grammes*	40 Gm.
Castor Oil, *five grammes*	5 Gm.
Carbolic Acid, *ten* "	10 Gm.
Alcohol, *two hundred and twenty-five grammes*	225 Gm.
Gauze Muslin	a sufficient quantity.

Dissolve the Resin, Castor Oil and Carbolic Acid in the Alcohol. Immerse in the mixture loosely-folded pieces of gauze muslin, allow them to become thoroughly saturated, then take them out and press out the excess of liquid, until the weight of the impregnated Gauze amounts to *one hundred and seventy* (170) *grammes*, for every *one hundred* (100) *grammes* of the original fabric. Spread out the pieces horizontally, and as soon as the Alcohol has nearly all evaporated, fold and wrap the pieces in paraffin paper, and preserve them in air-tight receptacles.

The impregnated Gauze, when dry, contains about 2.5 per cent. of Carbolic Acid.

Note.—The most suitable brands of gauze muslin for making carbolized or other antiseptic gauze, are those known in the market as "Stillwater," or "Lehigh E."

18. CARBASUS IODOFORMATA.

Iodoform Gauze.

Iodoform, *ten grammes*	10 Gm.
Ether (U. S. P.), *forty grammes*	40 Gm.
Alcohol, *forty grammes*	40 Gm.
Tincture of Benzoin (U. S. P.), *five grammes*	5 Gm.
Glycerin, *five grammes*	5 Gm.
Gauze Muslin	a sufficient quantity.

Dissolve the Iodoform in the Ether, then add the Alcohol, Tincture of Benzoin, and Glycerin. Immerse in a weighed quantity of this solution, contained in a suitable vessel, the exact amount of Gauze Muslin required to absorb the whole of it, to produce a product of a pre-

scribed percentage of iodoform, work it about with a pestle so as to impregnate it uniformly; then take it out, and hang it up to dry, in a horizontal position, and in a dark place. Lastly, wrap it in paraffin paper and preserve it in air-tight receptacles.

Note.—To calculate the amount of muslin and of iodoform solution required to obtain a product approximately of any required percentage of iodoform, let x denote this required percentage. Then take of the above Iodoform Solution *ten* (10) *times* this quantity (or 10 x). Also multiply the required percentage (x) by *three* (3), divide the resulting product by *two* (2), and subtract the quotient from *one hundred* (100). The remainder represents the number of parts by weight of Gauze Muslin to be used. Regarding the most suitable kind of Gauze Muslin, see note to *Carbasus Carbolata* (F. 17).

19. CERATUM CAMPHORÆ COMPOSITUM.

Compound Camphor Cerate.

Ceratum Camphoratum. Camphor Ice.

Camphor, in coarse powder, *one hundred and seven grammes* .	107 Gm.
White Wax, *one hundred and fifty grammes*	150 Gm.
Castor Oil, *two hundred and fifty grammes*	250 Gm.
Spermaceti, *four hundred and eighty grammes*	480 Gm.
Carbolic Acid, liquefied by warming, *two grammes*	2 Gm.
Oil of Bitter Almond, *one gramme*	1 Gm.
Benzoic Acid, *ten grammes*	10 Gm.

Melt the White Wax and Spermaceti on a water-bath, add the Castor Oil, and afterwards the Camphor, and continue heating and stirring until the Camphor is dissolved. Then withdraw the heat, cover the vessel, and when the mixture has somewhat cooled, add the remaining ingredients, and thoroughly incorporate them by stirring. Lastly, pour the Cerate into suitable moulds.

20. CERATUM EXTRACTI CANTHARIDIS.

(U. S. P., 1880).

Cerate of Extract of Cantharides.

Cantharides, in No. 60 powder, *three hundred grammes*	300 Gm.
Resin, *one hundred and fifty grammes*	150 Gm.
Yellow Wax, *three hundred and fifty grammes*	350 Gm.
Lard, *three hundred and fifty grammes*	350 Gm.
Alcohol	a sufficient quantity.

Moisten the Cantharides, with *one hundred and eighty* (180) *cubic centimeters* of Alcohol, and pack firmly in a cylindrical percolator; then gradually pour on Alcohol, until *one thousand eight hundred* (1800) *cubic centimeters* of percolate are obtained, or until the Cantharides are exhausted. Distil off the Alcohol by means of a water-bath, transfer the residue to a tared capsule and evaporate it, on a water-bath, until it weighs *one hundred and fifty* (150) *grammes*. Add to this the Resin,

Wax, and Lard, previously melted together, and keep the whole at a temperature of 100° C. (212° F.), for fifteen minutes. Lastly, strain the mixture through muslin, and stir it constantly until cool.

21. CERATUM SABINÆ.

(U. S. P., 1880).

Savine Cerate.

Fluid Extract of Savine, *twenty-five cubic centimeters*	25 Cc.
Resin Cerate, *ninety grammes*	90 Gm.

Melt the Resin Cerate by means of a water-bath, add the Fluid Extract of Savine, and continue the heat until the Alcohol has evaporated; then remove the heat, and stir constantly until cool.

22. CHARTA CANTHARIDIS.

(U. S. P., 1880).

Cantharides Paper.

White Wax, *eighty grammes*	80 Gm.
Spermaceti, *thirty grammes*	30 Gm.
Olive Oil, *forty grammes*	40 Gm.
Canada Turpentine, *ten grammes*	10 Gm.
Cantharides, in No. 40 powder, *ten grammes*	10 Gm.
Water, *one hundred cubic centimeters*	100 Cc.

Mix all the substances in a tinned vessel, and boil gently for two hours, constantly stirring. Strain through a woolen strainer without expressing, and, by means of a water-bath, keep the mixture in a shallow, flat-bottomed vessel with an extended surface. Coat strips of sized paper with the melted plaster, on one side only, by passing them successively over the surface of the liquid; when dry, cut the strips into rectangular pieces.

23. CHLORAL CAMPHORATUM.

Camphorated Chloral.

Chloral et Camphora. Chloral and Camphor.

Chloral, *fifty grammes*	50 Gm.
Camphor, *fifty grammes*	50 Gm.

Mix them by agitation in a bottle, or by trituration in a warm mortar, until they are liquefied and combined.

24. COLLODIUM IODATUM.

Iodized Collodion.

Iodine, reduced to powder, *five grammes*	5 Gm.
Flexible Collodion (U. S. P.), *ninety-five grammes*	95 Gm.

Introduce the Iodine into a bottle, add the Flexible Collodion and agitate until the Iodine is dissolved.

25. COLLODIUM IODOFORMATUM.

Iodoform Collodion.

Iodoform, *five grammes*	5 Gm.
Flexible Collodion (U. S. P.), *ninety-five grammes*	95 Gm.

Dissolve the Iodoform in the Flexible Collodion by agitation.

26. COLLODIUM TIGLII.

Croton Oil Collodion.

Croton Oil, *ten grammes*	10 Gm.
Flexible Collodion (U. S. P.), *ninety grammes*	90 Gm.

Mix them.

27. COLLODIUM SALICYLATUM COMPOSITUM.

Compound Salicylated Collodion.

Corn Collodion.

Salicylic Acid, *eleven grammes*	11 Gm.
Extract of Indian Hemp, *two grammes*	2 Gm.
Alcohol, *ten grammes*	10 Gm.
Flexible Collodion (U. S. P.), a sufficient quantity	
To make one hundred grammes	100 Gm.

Dissolve the Extract of Indian Hemp in the Alcohol, and the Salicylic Acid in about *fifty* (50) *grammes* of Flexible Collodion contained in a tared bottle. Then add the former solution to the latter, and finally add enough Flexible Collodion to make *one hundred* (100) *grammes*.

28. CORDIALE RUBI FRUCTUS.

Blackberry Cordial.

Blackberry Juice, *eighteen hundred and seventy-five cubic centimeters*	1875 Cc.
Cinnamon, in No. 40 powder, *one hundred grammes*	100 Gm.
Cloves, in No. 40 powder, *twenty-five grammes*	25 Gm.
Nutmeg, in No. 40 powder, *twenty-five grammes*	25 Gm.
Diluted Alcohol (U. S. P.)	a sufficient quantity.
Syrup (U. S. P.), *eighteen hundred and seventy-five cubic centimeters*	1875 Cc.

Percolate the powdered spices with Diluted Alcohol to obtain *twelve hundred and fifty* (1250) *cubic centimeters* of tincture and add to this the Blackberry Juice. Then add *thirty* (30) *grammes* of Purified Talcum, set the mixture aside for twenty-four hours, occasionally shaking, and filter. Wash the filter with sufficient Diluted Alcohol to obtain *thirty-one hundred and twenty-five* (3125) *cubic centimeters* of filtrate; lastly, add the Syrup, and mix well.

29. DECOCTUM ALOES COMPOSITUM.

Compound Decoction of Aloes.

Extract of Aloes (U. S. P.), *ten grammes*	10	Gm.
Myrrh, *seven and one-half grammes*	7.5	Gm.
Saffron, *seven and one-half grammes*	7.5	Gm.
Potassium Carbonate, *five grammes*	5	Gm.
Extract of Glycyrrhiza, in powder, *thirty-five grammes*	35	Gm.
Compound Tincture of Cardamom (U. S. P.), *two hundred and fifty cubic centimeters*	250	Cc.
Water, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Reduce the Myrrh and Extract of Aloes to a coarse powder, mix this with the Potassium Carbonate and Extract of Liquorice in a suitable covered vessel, and pour on *six hundred* (600) *cubic centimeters* of Water; boil for five minutes, and add the Saffron. When cool, add the Compound Tincture of Cardamom, and allow the mixture to macerate for two hours; then filter through flannel, and add enough Water to make the product measure *one thousand* (1000) *cubic centimeters.*

This preparation should be freshly made when wanted for use.

30. ELIXIR ACIDI SALICYLICI.

Elixir of Salicylic Acid.

Salicylic Acid, *eighty-five grammes*	85	Gm.
Potassium Citrate, *one hundred and twenty-five grammes*	125	Gm.
Glycerin, *five hundred cubic centimeters*	500	Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Potassium Citrate in the Glycerin with the aid of a gentle heat. Add the Salicylic Acid, and continue the heat until it is dissolved. Then add enough Aromatic Elixir to make *one thonsand* (1000) *cubic centimeters.*

This Elixir should be freshly made when wanted for use.

Each fluidrachm contains 5 grains of Salicylic Acid.

31. ELIXIR ADJUVANS.

Adjuvant Elixir.

Sweet Orange Peel, recently dried, *seventy-five grammes*	75	Gm.
Wild Cherry, *one hundred and fifty grammes*	150	Gm.
Glycyrrhiza, Russian, peeled, *three hundred grammes*	300	Gm.
Coriander, *forty grammes*	40	Gm.
Caraway, *forty grammes*	40	Gm.
Syrup (U. S. P.), *fifteen hundred cubic centimeters*	1500	Cc.
Alcohol,		
Water, of each, a sufficient quantity		
To make five thousand cubic centimeters	5000	Cc.

Grind the Wild Cherry to a moderately coarse (No. 40) powder, moisten it with *one hundred and fifty* (150) *cubic centimeters* of Water and set it aside for twelve hours. Reduce the other solids also to a moderately coarse (No. 40) powder, mix this intimately with the Wild Cherry, and having mixed *one* (1) *volume* of Alcohol with *two* (2) *volumes* of Water, moisten the powder with *one hundred and fifty* (150) *cubic centimeters* of the mixture, and pack tightly in a percolator. Then gradually pour menstruum on top until *thirty-five hundred* (3500) *cubic centimeters* of percolate are obtained. Mix this with *fifteen hundred* (1500) *cubic centimeters* of Syrup, and filter.

Note.—This preparation is chiefly intended as a vehicle, particularly for acrid or saline remedies.

32. ELIXIR AMMONII BROMIDI.

Elixir of Ammonium Bromide.

Ammonium Bromide, *eighty-five grammes*	85 Gm.
Citric Acid, *four grammes*	4 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Ammonium Bromide and the Citric Acid in about *five hundred* (500) *cubic centimeters* of Aromatic Elixir, by agitation. Then add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*, and filter, if necessary.

Each fluidrachm contains 5 grains of Ammonium Bromide.

33. ELIXIR AMMONII VALERIANATIS.

Elixir of Ammonium Valerianate.

Ammonium Valerianate, *thirty-five grammes*	35 Gm.
Chloroform, *eight-tenths of a cubic centimeter*	0.8 Cc.
Tincture of Vanilla (U. S. P.), *sixteen cubic centimeters* . . .	16 Cc.
Compound Tincture of Cudbear (F. 419), *sixteen cubic centimeters*	16 Cc.
Water of Ammonia (U. S. P.),	
Aromatic Elixir (U. S. P.), of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Ammonium Valerianate in about *seventy-five* (75) *cubic centimeters* of Aromatic Elixir, in a graduated vessel, and add enough Water of Ammonia, in drops, until a faint excess of it is perceptible in the liquid. Then add the Chloroform, Tincture of Vanilla and Compound Tincture of Cudbear, and finally, enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*. Filter, if necessary.

Each fluidrachm contains 2 grains of Ammonium Valerianate.

Note.—Should the odor of valerianic acid become perceptible after the Elixir has been kept for some time, it may be overcome by slightly supersaturating with Water of Ammonia.

34. ELIXIR AMMONII VALERIANATIS ET QUININÆ.

Elixir of Ammonium Valerianate and Quinine.

Quinine Hydrochlorate, *four and one-fourth grammes*	4.25	Gm.
Elixir of Ammonium Valerianate (F. 33), *one thousand cubic centimeters*	1000	Cc.

Dissolve the Quinine Hydrochlorate in the Elixir by agitation, and, if necessary, by occasionally immersing the bottle containing the ingredients in hot water, until solution has been effected. Finally filter.

Each fluidrachm contains ¼ grain of Quinine Hydrochlorate and 2 grains of Ammonium Valerianate.

35. ELIXIR ANISI.

Elixir of Anise.

Aniseed Cordial.

Anethol, *three and one-half cubic centimeters*	3.5	Cc.
Oil of Fennel, *one-half cubic centimeter*	0.5	Cc.
Spirit of Bitter Almond (U. S. P.), *twelve cubic centimeters* .	12	Cc.
Deodorized Alcohol, *two hundred and forty cubic centimeters* .	240	Cc.
Syrup (U. S. P.), *six hundred and twenty-five cubic centimeters*	625	Cc.
Water, *one hundred and twenty-five cubic centimeters*	125	Cc.
Magnesium Carbonate, *fifteen grammes*	15	Gm.

Mix the Anethol, the Oil, and the Spirit of Bitter Almond with the Deodorized Alcohol, add the Syrup and Water, and set the mixture aside for twelve hours. Then mix it intimately with the Magnesium Carbonate, and filter it through a wetted filter, returning the first portions of the filtrate until it runs through clear.

Note.—This Elixir is liable to become cloudy, from separation of essential oils, when it is exposed to a temperature lower than that at which it has been filtered. In general, it is recommended that it be cooled to, and filtered at a temperature of about 15° C. (59° F.). In the northern sections of this country, or in winter time, it should be cooled to a proportionately lower temperature, previous to filtration.

Anethol is the stearopten of oil of anise, and possesses a finer and purer aroma and taste than any commercial variety of oil of anise. If it cannot be readily obtained, the so-called Saxon oil of anise may be substituted for it. Oil of star-anise, which is usually supplied by dealers when "oil of anise" without specification is ordered, does not answer well for this purpose. The oil of fennel should be that from the seed ("sweet"), and not that from the chaff.

36. ELIXIR APII GRAVEOLENTIS COMPOSITUM.

Compound Elixir of Celery.

Fluid Extract of Celery Seed (F. 139), *sixty-two cubic centimeters*	62 Cc.
Fluid Extract of Erythroxylon (U. S. P.), *sixty-two cubic centimeters*	62 Cc.
Fluid Extract of Kola (F. 175), *sixty-two cubic centimeters*	62 Cc.
Fluid Extract of Viburnum Prunifolium (U. S. P.), *sixty-two cubic centimeters*	62 Cc.
Alcohol, *one hundred and twenty-five cubic centimeters*	125 Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Alcohol with *two hundred and fifty* (250) *cubic centimeters* of Aromatic Elixir. To this add the Fluid Extract of Celery Seed in several portions, shaking after each addition, and afterwards the other Fluid Extracts. Finally add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*, allow the mixture to stand twenty-four hours, and filter.

Note.— If this preparation is prescribed or quoted under its Latin title, it is recommended that the full title be given, so that the word "Apii" may not be mistaken for "Opii."

37. ELIXIR BISMUTHI.

Elixir of Bismuth.

Bismuth and Ammonium Citrate, *thirty-five grammes*	35 Gm.
Water, hot, *sixty cubic centimeters*	60 Cc.
Water of Ammonia (U. S. P.).	
Aromatic Elixir (U. S. P.), of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Bismuth and Ammonium Citrate in the hot Water, allow the solution to stand until any undissolved matter has subsided; then decant the clear liquid, and add to the residue just enough Water of Ammonia to dissolve it. Then mix it with the decanted portion and add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*. Filter, if necessary.

Each fluidrachm represents 2 grains of Bismuth and Ammonium Citrate.

38. ELIXIR BUCHU.

Elixir of Buchu.

Fluid Extract of Buchu (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Alcohol, *sixty-two cubic centimeters*	62 Cc.
Syrup (U. S. P.), *sixty-two cubic centimeters*	62 Cc.
Magnesium Carbonate, *fifteen grammes*	15 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Fluid Extract of Buchu with the Alcohol, then add *seven hundred and fifty* (750) *cubic centimeters* of Aromatic Elixir, and the Syrup. Incorporate with it the Magnesium Carbonate, and filter. Finally, pass enough Aromatic Elixir through the filter to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents about 7½ grains of Buchu.

39. ELIXIR BUCHU COMPOSITUM.

Compound Elixir of Buchu.

Compound Fluid Extract of Buchu (F. 144), *two hundred and fifty cubic centimeters*	250 Cc.
Alcohol, *sixty-two cubic centimeters*	62 Cc.
Syrup (U. S. P.), *sixty-two cubic centimeters*	62 Cc.
Magnesium Carbonate, *fifteen grammes*	15 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Compound Fluid Extract of Buchu with the Alcohol, then add *five hundred* (500) *cubic centimeters* of Aromatic Elixir, and the Syrup. Incorporate with it the Magnesium Carbonate, and filter. Finally, pass enough Aromatic Elixir through the filter to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents 15 minims of Compound Fluid Extract of Buchu.

40. ELIXIR BUCHU ET POTASSII ACETATIS

Elixir of Buchu and Potassium Acetate.

Potassium Acetate, *eighty-five grammes*	85 Gm.
Elixir of Buchu (F. 38), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Potassium Acetate in about *seven hundred and fifty* (750) *cubic centimeters* of Elixir of Buchu, filter, if necessary, and add enough Elixir of Buchu to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents 5 grains of Potassium Acetate and about 7 grains of Buchu.

41. ELIXIR CAFFEINÆ.

Elixir of Caffeine.

Caffeine, *seventeen and one-half grammes*	17.5 Gm.
Diluted Hydrobromic Acid (U. S. P.), *four cubic centimeters.*	4 Cc.
Syrup of Coffee (F. 367), *two hundred and fifty cubic centimeters*	250 Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Rub the Caffeine, in a mortar, with the Diluted Hydrobromic Acid

and about *one hundred and twenty-five* (125) *cubic centimeters* of Aromatic Elixir, until solution is effected. Then add the Syrup of Coffee, and lastly, enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*. Filter, if necessary.

Each fluidrachm contains 1 grain of Caffeine.

42. ELIXIR CALCII BROMIDI.

Elixir of Calcium Bromide.

Calcium Bromide, *eighty-five grammes*	85 Gm.
Citric Acid, *four grammes*	4 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Calcium Bromide and the Citric Acid in about *seven hundred and fifty* (750) *cubic centimeters* of Aromatic Elixir by agitation. Then add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*, and filter, if necessary.

Each fluidrachm contains 5 grains of Calcium Bromide.

43. ELIXIR CALCII HYPOPHOSPHITIS.

Elixir of Calcium Hypophosphite.

Calcium Hypophosphite, *thirty-five grammes*	35 Gm.
Citric Acid, *four grammes*	4 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Calcium Hypophosphite in *nine hundred* (900) *cubic centimeters* of Aromatic Elixir, and filter. Dissolve the Citric Acid in the filtrate and pass enough Aromatic Elixir through the filter to make *one thousand* (1000) *cubic centimeters*.

Each fluidrachm contains 2 grains of Calcium Hypophosphite.

44. ELIXIR CALCII LACTOPHOSPHATIS.

Elixir of Calcium Lactophosphate.

Calcium Lactate, *seventeen and one-half grammes*	17.5 Gm.
Phosphoric Acid (U. S. P., 85%), *eight cubic centimeters*	8 Cc.
Water, *sixty cubic centimeters*	60 Cc.
Syrup (U. S. P.), *sixty cubic centimeters*	60 Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Calcium Lactate with the Phosphoric Acid, the Water, and the Syrup, until the salt is dissolved. Then add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*, and filter.

Each fluidrachm represents 1 grain of Calcium Lactate, or about 1½ grains of so-called Calcium Lactophosphate.

45. ELIXIR CATHARTICUM COMPOSITUM.

Compound Cathartic Elixir.

Fluid Extract of Senna (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Fluid Extract of Podophyllum (U. S. P.), *sixty-two cubic centimeters*	62 Cc.
Fluid Extract of Leptandra (U. S. P.), *fifty cubic centimeters.*	50 Cc.
Fluid Extract of Jalap (F. 162), *fifty cubic centimeters*	50 Cc.
Potassium and Sodium Tartrate, *one hundred and twenty-five grammes*	125 Gm.
Sodium Bicarbonate, *sixteen grammes*	16 Gm.
Compound Elixir of Taraxacum (F. 111), *two hundred and fifty cubic centimeters*	250 Cc.
Elixir of Glycyrrhiza (F. 76), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the fluid extracts with the Compound Elixir of Taraxacum; in the mixture, dissolve the salts by agitation, and add enough Elixir of Glycyrrhiza to make *one thousand* (1000) *cubic centimeters.*

The product should not be filtered, and should be shaken up whenever any of it is dispensed.

The average dose for an adult is 2 fluidrachms.

46. ELIXIR CHLOROFORMI COMPOSITUM.

Compound Elixir of Chloroform.

Chloroform, *one hundred and ninety cubic centimeters*	190 Cc.
Tincture of Opium (U. S. P.), *one hundred and ninety cubic centimeters*	190 Cc.
Spirit of Camphor (U. S. P.), *one hundred and ninety cubic centimeters*	190 Cc.
Aromatic Spirit of Ammonia (U. S. P.), *one hundred and ninety cubic centimeters*	190 Cc.
Alcohol, *two hundred and thirty-five cubic centimeters*	235 Cc.
Oil of Cinnamon (Cassia), *five cubic centimeters*	5 Cc.

Mix the Chloroform with the Alcohol, then add the Oil of Cinnamon, Aromatic Spirit of Ammonia, Spirit of Camphor and Tincture of Opium. Allow the mixture to stand a few hours, and filter in a well-covered funnel.

Each fluidrachm represents about 1 grain of Opium and 11 minims of Chloroform.

Note.—This preparation is called Chloroform Paregoric in some sections of the country. It is recommended that this title be abandoned, to prevent confusion with the official Paregoric or *Tinctura Opii Camphorata.*

47. ELIXIR CINCHONÆ.

Elixir of Cinchona.

Elixir of Calisaya.

Tincture of Cinchona (U. S. P.), *one hundred and fifty cubic centimeters*	150 Cc.
Syrup (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Glycerin, *one hundred and twenty-five cubic centimeters*	125 Cc.
Aromatic Elixir (U. S. P.), *six hundred cubic centimeters*	600 Cc.

Mix the Liquids, allow to stand as long as convenient, and filter through a wetted filter.

Each fluid ounce represents about fourteen (14) grains of Yellow Cinchona.

48. ELIXIR CINCHONÆ DETANNATUM.

Detannated Elixir of Cinchona.

Detannated Elixir of Calisaya.

Detannated Tincture of Cinchona (F. 403), *one hundred and fifty cubic centimeters*	150 Cc.
Syrup (U. S. P.), *one hundred and twenty-five cubic centimeters.*	125 Cc.
Glycerin, *one hundred and twenty-five cubic centimeters*	125 Cc.
Aromatic Elixir (U. S. P.), *six hundred cubic centimeters*	600 Cc.

Mix the Liquids, and filter, if necessary.

Each fluid ounce represents about fourteen (14) grains of Yellow Cinchona.

Note.—This preparation may be used when *Elixir Cinchonæ* is directed in combination with preparations of Iron, but may be replaced by *Compound Elixir of Quinine* (F. 98), colored by the addition of *fifteen* (15) *cubic centimeters* of Compound Tincture of Cudbear (F. 419) to *one thousand* (1000) *cubic centimeters.*

49. ELIXIR CINCHONÆ ET HYPOPHOSPHITUM.

Elixir of Cinchona and Hypophosphites.

Elixir of Calisaya and Hypophosphites.

Calcium Hypophosphite, *seventeen and one-half grammes*	17.5 Gm.
Sodium Hypophosphite, *seventeen and one-half grammes*	17.5 Gm.
Citric Acid, *four grammes*	4 Gm.
Water, *one hundred and twenty-five cubic centimeters*	125 Cc.
Elixir of Cinchona (F. 47), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Hypophosphites and the Citric Acid in the Water, add enough Elixir of Cinchona to make *one thousand* (1000) *cubic centimeters*, and filter.

Each fluidrachm contains 1 grain, each, of the Hypophosphites of Calcium and Sodium.

50. ELIXIR CINCHONÆ ET FERRI.

Elixir of Cinchona and Iron.

Elixir of Calisaya and Iron. Ferrated Elixir of Calisaya.

Phosphate of Iron (U. S. P.), *thirty-five grammes*	35 Gm.
Water, boiling, *sixty cubic centimeters*	60 Cc.
Compound Elixir of Quinine (F. 98), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Phosphate of Iron in the boiling Water, then add enough Compound Elixir of Quinine to make *one thousand* (1000) *cubic centimeters*, and filter.

Each fluidrachm contains 2 grains of Phosphate of Iron.

51. ELIXIR CINCHONÆ, FERRI, BISMUTHI ET STRYCHNINÆ.

Elixir of Cinchona, Iron, Bismuth and Strychnine.

Elixir of Calisaya, Iron, Bismuth and Strychnine.

Strychnine Sulphate, *one hundred and seventy-five milligrammes*	0.175 Gm.
Water, hot, *ten cubic centimeters*	10 Cc.
Elixir of Cinchona, Iron, and Bismuth (F. 52), *nine hundred and ninety cubic centimeters*	990 Cc.

Dissolve the Strychnine Sulphate in the hot Water, add the Elixir of Cinchona, Iron and Bismuth, and filter, if necessary.

52. ELIXIR CINCHONÆ, FERRI ET BISMUTHI.

Elixir of Cinchona, Iron and Bismuth.

Elixir of Calisaya, Iron and Bismuth.

Bismuth and Ammonium Citrate, *seventeen and one-half grammes*	17.5 Gm.
Water, hot, *thirty cubic centimeters*	30 Cc.
Water of Ammonia (U. S. P.)	a sufficient quantity.
Elixir of Cinchona and Iron (F. 50), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Bismuth and Ammonium Citrate in the hot Water, allow the solution to stand until any undissolved matter has subsided; then decant the clear liquid, and add to the residue enough Water of Ammonia to dissolve it, carefully avoiding an excess. Then mix the solution with enough Elixir of Cinchona and Iron to make *one thousand* (1000) *cubic centimeters*. Let the mixture stand twenty-four hours, if convenient, and filter.

Each fluidrachm contains 1 grain of Bismuth and Ammonium Citrate, and nearly 2 grains of Phosphate of Iron

53. ELIXIR CINCHONÆ, FERRI, ET CALCII LACTOPHOSPHATIS.

Elixir of Cinchona, Iron and Calcium Lactophosphate.

Elixir of Calisaya, Iron and Lactophosphate of Lime.

Calcium Lactate, *eight and one-half grammes*	8.5	Gm.
Phosphoric Acid (U. S. P., 85 %), *four cubic centimeters*	4	Cc.
Water of Ammonia (U. S. P.), *thirty-two cubic centimeters*	32	Cc.
Citric Acid, *sixteen grammes*	16	Gm.
Elixir of Cinchona and Iron (F. 50), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Calcium Lactate in *four hundred and fifty* (450) *cubic centimeters* of Elixir of Cinchona and Iron, with the aid of the Phosphoric Acid. Then add the Citric Acid, and when this is dissolved, the Water of Ammonia. Finally add enough Elixir of Cinchona and Iron to make *one thousand* (1000) *cubic centimeters*, and filter.

Each fluidrachm contains ½ grain of Calcium Lactate (or about ¾ grain of so-called Calcium Lactophosphate), and nearly 2 grains of Phosphate of Iron.

54. ELIXIR CINCHONÆ, FERRI ET PEPSINI.

Elixir of Cinchona, Iron and Pepsin.

Elixir of Calisaya, Iron and Pepsin.

Pepsin (U. S. P.), *seventeen and one-half grammes*	17.5	Gm.
Hydrochloric Acid (U. S. P.), *four cubic centimeters*	4	Cc.
Water, *one hundred and seventy-five cubic centimeters*	175	Cc.
Elixir of Cinchona and Iron (F. 50), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Pepsin in the Water mixed with the Hydrochloric Acid; then add enough Elixir of Cinchona and Iron to make *one thousand* (1000) *cubic centimeters*. Let the mixture stand a few days, if convenient, and filter.

Each fluidrachm represents 1 grain of Pepsin and about 1½ grains of Phosphate of Iron.

55. ELIXIR CINCHONÆ, FERRI ET STRYCHNINÆ.

Elixir of Cinchona, Iron and Strychnine.

Elixir of Calisaya, Iron and Strychnine.

Strychnine Sulphate, *one hundred and seventy-five milligrammes*	0.175	Gm.
Water, *fifteen cubic centimeters*	15	Cc.
Elixir of Cinchona and Iron (F. 50), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Strychnine Sulphate in the Water and add enough Elixir of Cinchona and Iron to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm contains $\frac{1}{100}$ *grain of Strychnine Sulphate, and about 2 grains of Phosphate of Iron.*

56. ELIXIR CINCHONÆ, PEPSINI ET STRYCHNINÆ.

Elixir of Cinchona, Pepsin and Strychnine.

Elixir of Calisaya, Pepsin and Strychnine.

Quinine Sulphate, *two grammes*	2	Gm.
Cinchonine Sulphate, *one gramme*	1	Gm.
Strychnine Sulphate, *one hundred and seventy-five milligrammes*	0.175	Gm.
Elixir of Pepsin (F. 88), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the alkaloidal salts in the Elixir, and filter, if necessary.

Each fluidrachm represents small quantities of Cinchona Alkaloids, $\frac{1}{100}$ *grain of Strychnine Sulphate, and 1 grain of Pepsin.*

57. ELIXIR CORYDALIS COMPOSITUM.

Compound Elixir of Corydalis.

Fluid Extract of Corydalis (F. 154), *sixty cubic centimeters*	60	Cc.
Fluid Extract of Stillingia (U. S. P.), *sixty cubic centimeters.*	60	Cc.
Fluid Extract of Xanthoxylum (U. S. P.), *thirty cubic centimeters*	30	Cc.
Fluid Extract of Iris (U. S. P.), *ninety cubic centimeters*	90	Cc.
Alcohol, *one hundred and twenty-five cubic centimeters*	125	Cc.
Potassium Iodide, *fifty grammes*	50	Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Mix the Alcohol with the Fluid Extracts, dissolve the Potassium Iodide in the mixture, and add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters.* Let the mixture stand a few days, if convenient, and filter.

Each fluidrachm contains 3 grains of Potassium Iodide, and small quantities of the several Fluid Extracts.

58. ELIXIR CURASSAO.

Elixir of Curaçao.

Curaçao Cordial.

Spirit of Curaçao (F. 348), *sixteen cubic centimeters*	16	Cc.
Orris Root, in fine powder, *four grammes*	4	Gm.
Deodorized Alcohol, *two hundred and fifty cubic centimeters*	250	Cc.
Citric Acid, *seven grammes*	7	Gm.
Syrup (U. S. P.), *five hundred cubic centimeters*	500	Cc.
Magnesium Carbonate, *fifteen grammes*	15	Gm.
Water, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Mix the Spirit of Curaçao with the Alcohol, add the Orris Root, the Magnesium Carbonate, and *one hundred and eighty-five* (185) *cubic centimeters* of Water. Allow the mixture to stand twelve hours, occasionally agitating; then pour it on a wetted filter, returning the first portions of the filtrate until it runs through clear, and pass enough Water through the filter to make the filtrate measure *five hundred* (500) *cubic centimeters*. In this dissolve the Citric Acid, and finally add the Syrup.

59. ELIXIR DIGESTIVUM COMPOSITUM.

Compound Digestive Elixir.

Compound Elixir of Pepsin.

Pepsin (U. S. P.), *ten grammes*	10 Gm.
Pancreatin (U. S. P.), *one gramme*	1 Gm.
Diastase, *one gramme*	1 Gm.
Lactic Acid, *three grammes*	3 Gm.
Hydrochloric Acid (U. S. P.), *six cubic centimeters*	6 Cc.
Glycerin, *two hundred and fifty cubic centimeters*	250 Cc.
Water, *one hundred and twenty-five cubic centimeters*	125 Cc.
Tincture of Cudbear (F. 418), *fifteen cubic centimeters*	15 Cc.
Purified Talcum (F. 395), *fifteen grammes*	15 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Acids with the Glycerin and Water, add the Pepsin, Pancreatin, and Diastase, to this mixture, and macerate with occasional shaking, until solution is apparently effected. Then add the Tincture of Cudbear and enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*. Incorporate the Purified Talcum thoroughly with the mixture, and filter.

Note.—The best commercial variety of Diastase, capable of converting the largest amount of Starch into Dextrin and Glucose, should be used for this preparation.

60. ELIXIR ERIODICTYI AROMATICUM.

Aromatic Elixir of Eriodictyon.

Aromatic Elixir of Yerba Santa; Elixir Corrigens.

Fluid Extract of Eriodictyon (U. S. P.), *sixty-two and one-half cubic centimeters*	62.5 Cc.
Syrup (U. S. P.), *five hundred cubic centimeters*	500 Cc.
Pumice, in fine powder, *thirty grammes*	30 Gm.
Magnesium Carbonate, *eleven grammes*	11 Gm.
Compound Elixir of Taraxacum (F. 111), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix *four hundred and fifty* (450) *cubic centimeters* of Compound Elixir of Taraxacum with the Syrup and Pumice, then add the Fluid Extract, and mix the whole thoroughly by agitation. Shake the mixture occa-

sionally during two hours, then allow it to settle, and carefully decant the liquid into a funnel, the neck of which contains a small pellet of absorbent cotton. Afterwards add the dregs and allow them to drain. To the filtrate add the Magnesium Carbonate, and shake occasionally during several hours. Let the mixture stand at rest during twelve hours, if convenient, then decant the liquid and filter it through paper. To the filtrate add enough Compound Elixir of Taraxacum, if necessary, to make *one thousand* (1000) *cubic centimeters.*

Note.—This preparation is chiefly intended as a vehicle for Quinine and other bitter remedies.

61. ELIXIR ERYTHROXYLI.

Elixir of Erythroxylon.

Elixir of Coca.

Fluid Extract of Erythroxylon (U. S. P.), *one hundred and twenty-five cubic centimeters*	125	Cc.
Alcohol, *sixty-two and one-half cubic centimeters*	62.5	Cc.
Syrup (U. S. P.), *one hundred and twenty-five cubic centimeters*	125	Cc.
Tincture of Vanilla (U. S. P.), *sixteen cubic centimeters*	16	Cc.
Purified Talcum (F. 395), *fifteen grammes*	15	Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Mix the Fluid Extract with the Alcohol, the Syrup, and *six hundred and fifty* (650) *cubic centimeters* of Aromatic Elixir, add the Purified Talcum and incorporate the latter thoroughly. Let the mixture stand during forty-eight hours, if convenient, shaking occasionally; then filter, add the Tincture of Vanilla to the filtrate, and pass enough Aromatic Elixir through the filter to make the product measure *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents 7½ grains of Erythroxylon (*Coca*).

62. ELIXIR ERYTHROXYLI ET GUARANÆ.

Elixir of Erythroxylon and Guarana.

Elixir of Coca and Guarana.

Fluid Extract of Erythroxylon (U. S. P.), *one hundred and twenty-five cubic centimeters*	125	Cc.
Fluid Extract of Guarana (U. S. P.), *one hundred and twenty-five cubic centimeters*	125	Cc.
Purified Talcum (F. 395), *fifteen grammes*	15	Gm.
Compound Elixir of Taraxacum (F. 111), *seven hundred and fifty cubic centimeters*	750	Cc.

Mix the liquids, and thoroughly incorporate the Purified Talcum

with the mixture. Let it stand during forty-eight hours, if convenient, occasionally agitating, then filter.

Each fluidrachm represents 7½ grains each of Erythroxylon (Coca) and Guarana.

63. ELIXIR EUCALYPTI.

Elixir of Eucalyptus.

Fluid Extract of Eucalyptus (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Alcohol, *one hundred and twenty-five cubic centimeters*	125 Cc.
Magnesium Carbonate, *sixteen grammes*	16 Gm.
Syrup of Coffee (F. 367), *three hundred and seventy-five cubic centimeters*	375 Cc.
Compound Elixir of Taraxacum (F. 111), *three hundred and seventy-five cubic centimeters*	375 Cc.

Mix the Fluid Extract with the Alcohol, then add the other ingredients, shake the mixture occasionally during forty-eight hours, and filter.

Each fluidrachm represents 7½ grains of Eucalyptus.

64. ELIXIR EUONYMI.

Elixir of Euonymus.

Elixir of Wahoo.

Fluid Extract of Euonymus (U. S. P.), *one hundred and fifty cubic centimeters*	150 Cc.
Water, *one hundred and twenty-five cubic centimeters*	125 Cc.
Syrup of Coffee (F. 367), *one hundred and twenty-five cubic centimeters*	125 Cc.
Compound Elixir of Taraxacum (F. 111), *six hundred cubic centimeters*	600 Cc.

Mix them, let the mixture stand forty-eight hours, and filter.

Each fluidrachm represents about 9½ grains of Euonymus.

65. ELIXIR FERRI HYPOPHOSPHITIS.

Elixir of Hypophosphite of Iron.

Solution of Hypophosphite of Iron (F. 219), *one hundred cubic centimeters*	100 Cc.
Aromatic Elixir (U. S. P.), *nine hundred cubic centimeters*	900 Cc.

Mix, allow the mixture to stand a few days in a cool place, and filter, if necessary.

Each fluidrachm contains 1 grain of Hypophosphite of Iron (ferric).

66. ELIXIR FERRI LACTATIS.

Elixir of Lactate of Iron.

Lactate of Iron, in crusts, *seventeen and one-half grammes* . .	17.5 Gm.
Potassium Citrate, *fifty-two and one-half grammes*	52.5 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Lactate of Iron with the Potassium Citrate and about *two hundred and fifty* (250) *cubic centimeters* of Aromatic Elixir, gradually added, until solution has been effected. Then add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*, and filter.

Each fluidrachm contains 1 grain of Lactate of Iron.

67. ELIXIR FERRI PHOSPHATIS.

Elixir of Phosphate of Iron.

Phosphate of Iron (U. S. P.), *thirty-five grammes*	35 Gm.
Water, *sixty cubic centimeters*	60 Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Phosphate of Iron in the Water with the aid of heat; then mix this solution with a sufficient quantity of Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*. Filter, if necessary.

Each fluidrachm contains 2 grains of Phosphate of Iron.

68. ELIXIR FERRI PHOSPHATIS, CINCHONIDINÆ ET STRYCHNINÆ.

Elixir of Phosphate of Iron, Cinchonidine and Strychnine.

Phosphate of Iron (U. S. P.), *thirty-five grammes*	35	Gm.
Potassium Citrate, *four and one-half grammes*	4.5	Gm.
Cinchonidine Sulphate, *eight and one-half grammes*	8.5	Gm.
Strychnine Sulphate, *one hundred and seventy-five milligrammes*	0.175	Gm.
Alcohol, *sixty-five cubic centimeters*	65	Cc.
Water, *fifty cubic centimeters*	50	Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Phosphate of Iron and Potassium Citrate in the Water, using heat, if necessary. To *seven hundred and fifty* (750) *cubic centimeters* of Aromatic Elixir, contained in a bottle, add the Alcohol, and afterwards the alkaloidal salts, and agitate until the latter are dissolved,

or nearly so. Then mix the two solutions, and, having shaken the mixture, add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*. Finally, filter.

Each fluidrachm contains 2 grains of Phosphate of Iron, ½ grain of Cinchonidine Sulphate, and $\frac{1}{100}$ grain of Strychnine Sulphate.

Note.—When this Elixir is mixed with water, it may become cloudy or opaque through the separation of some of its constituents.

69. ELIXIR FERRI PHOSPHATIS, QUININÆ ET STRYCHNINÆ.

Elixir of Phosphate of Iron, Quinine, and Strychnine.

Phosphate of Iron (U. S. P.), *seventeen and one-half grammes*	17.5	Gm.
Quinine (alkaloid), *eight and three-fourths grammes*	8.75	Gm.
Strychnine (alkaloid), *two hundred and seventy-five milligrammes*	0.275	Gm.
Alcohol, *one hundred and thirty cubic centimeters*	130	Cc.
Water, *fifty cubic centimeters*	50	Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the alkaloids in the Alcohol and add *seven hundred and fifty* (750) *cubic centimeters* of Aromatic Elixir, then dissolve the Phosphate of Iron in the Water, using heat, if necessary, and add to the previous mixture. Finally, add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*.

Each fluidrachm contains 1 grain of Phosphate of Iron, ½ grain of Quinine, and $\frac{1}{64}$ grain of Strychnine.

Note.—When this Elixir is mixed with water, it may become cloudy or opaque through the separation of some of its constituents.

70. ELIXIR FERRI PYROPHOSPHATIS.

Elixir of Pyrophosphate of Iron.

Pyrophosphate of Iron (U. S. P.), *thirty-five grammes*	35	Gm.
Water, *sixty cubic centimeters*	60	Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Pyrophosphate of Iron in the Water, and add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*. Filter, if necessary.

Each fluidrachm contains 2 grains of Pyrophosphate of Iron.

71. ELIXIR FERRI, QUININÆ ET STRYCHNINÆ.

Elixir of Iron, Quinine and Strychnine.

Tincture of Citro-Chloride of Iron (F. 407), *one hundred and twenty-five cubic centimeters*	125	Cc.
Quinine Hydrochlorate, *eight and one-half grammes*	8.5	Gm.
Strychnine Sulphate, *one hundred and seventy-five milligrammes*	0.175	Gm.
Alcohol, *thirty cubic centimeters*	30	Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the alkaloidal salts in about *seven hundred and fifty* (750) *cubic centimeters* of Aromatic Elixir, then add the Tincture and the Alcohol, and finally, enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*. Filter, if necessary.

Each fluidrachm represents about 1 grain of Ferric Chloride, ½ grain of Quinine Hydrochlorate, and $\frac{1}{100}$ grain of Strychnine Sulphate.

72. ELIXIR FRANGULÆ.

Elixir of Frangula.

Elixir of Buckthorn.

Fluid Extract of Frangula (U. S. P.), *two hundred and fifty cubic centimeters*	250	Cc.
Alcohol, *sixty cubic centimeters*	60	Cc.
Compound Elixir of Taraxacum (F. 111), *two hundred and fifty cubic centimeters*	250	Cc.
Aromatic Elixir (U. S. P.), *four hundred and forty cubic centimeters*	440	Cc.

Mix them, allow the mixture to stand during forty-eight hours, if convenient, and filter.

Each fluidrachm represents 15 grains of Frangula.

73. ELIXIR GENTIANÆ.

Elixir of Gentian.

Fluid Extract of Gentian (U. S. P.), *thirty-five cubic centimeters*	35	Cc.
Compound Spirit of Cardamom (F. 347), *twenty-five cubic centimeters*	25	Cc.
Solution of Tersulphate of Iron (U. S. P.), *twenty-five cubic centimeters*	25	Cc.
Water of Ammonia (U. S. P.), *twenty-eight cubic centimeters*	28	Cc.
Alcohol,		
Water,		
Aromatic Elixir (U. S. P.), of each, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dilute the Solution of Tersulphate of Iron with *two hundred and fifty* (250) *cubic centimeters* of cold Water, and add it, constantly stirring, to the Water of Ammonia, previously diluted with an equal volume of cold Water. Collect the precipitate on a well wetted muslin strainer, allow it to drain completely, return it to the vessel, mix it intimately with *two hundred and fifty* (250) *cubic centimeters* of Water, and again drain. Repeat this operation once more with the same quantity of Water. When the precipitate has been completely drained for the third time, fold the strainer, and press it gently so as to remove the Water as completely as possible without loss of magma; then remove the magma into a tared bottle, and ascertain its weight. Now add to the magma *one-fifth* (⅕) of its weight of Alcohol, the Fluid Extract, the Compound Spirit, and *seven hundred and fifty* (750) *cubic centimeters* of Aromatic Elixir, and shake the mixture occasionally during twenty-four hours. Filter through paper, and pass enough Aromatic Elixir through the filter to make the product measure *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents about 2 grains of Gentian.

74. ELIXIR GENTIANÆ CUM TINCTURA FERRI CHLORIDI.

Elixir of Gentian with Tincture of Chloride of Iron.

Tincture of Citro-Chloride of Iron (F. 407), *one hundred cubic centimeters*	100 Cc.
Elixir of Gentian (F. 73), *nine hundred cubic centimeters* . . .	900 Cc.

Mix and filter, if necessary.

Each fluidrachm represents about ¾ grain of Ferric Chloride, and nearly 2 grains of Gentian.

75. ELIXIR GENTIANÆ ET FERRI PHOSPHATIS.

Elixir of Gentian and Phosphate of Iron.

Elixir Gentianæ Ferratum. Ferrated Elixir of Gentian. Ferrophosphated Elixir of Gentian.

Phosphate of Iron (U. S. P.), *seventeen and one-half grammes* .	17.5 Gm.
Water, *thirty-five cubic centimeters*	35 Cc.
Elixir of Gentian (F. 73), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Phosphate of Iron in the Water with the aid of heat, and add enough Elixir of Gentian to make *one thousand* (1000) *cubic centimeters.* Filter, if necessary.

Each fluidrachm represents 1 grain of Phosphate of Iron, and nearly 2 grains of Gentian.

76. ELIXIR GLYCYRRHIZÆ.

Elixir of Glycyrrhiza.

Elixir of Liquorice.

Fluid Extract of Glycyrrhiza (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Aromatic Elixir (U. S. P.), *eight hundred and seventy-five cubic centimeters*	875 Cc.

Mix and filter, if necessary.

77. ELIXIR GLYCYRRHIZÆ AROMATICUM.

Aromatic Elixir of Glycyrrhiza.

Aromatic Elixir of Liquorice.

Fluid Extract of Glycyrrhiza (U. S. P.), *one hundred and twenty-five cubic centimeters*	125	Cc.
Oil of Cloves, *four-tenths of a cubic centimeter*	0.4	Cc.
Oil of Cinnamon (Ceylon), *four-tenths of a cubic centimeter*	0.4	Cc.
Oil of Nutmegs, *one-fourth of a cubic centimeter*	0.25	Cc.
Oil of Fennel, *three-fourths of a cubic centimeter*	0.75	Cc.
Magnesium Carbonate, *fifteen grammes*	15	Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Triturate the Oils with the Magnesium Carbonate, and gradually add *eight hundred and seventy-five* (875) *cubic centimeters* of Aromatic Elixir. Shake occasionally during an hour, filter, and pass enough Aromatic Elixir through the filter to make *eight hundred and seventy-five* (875) *cubic centimeters* of filtrate. Add the fluid extract to the filtrate, mix, and filter, if necessary.

78. ELIXIR GRINDELIÆ.

Elixir of Grindelia.

Fluid Extract of Grindelia (U. S. P.), *sixty-five cubic centimeters*	65 Cc.
Compound Spirit of Orange (U. S. P.), *ten cubic centimeters*	10 Cc.
Deodorized Alcohol, *one hundred and fifteen cubic centimeters.*	115 Cc.
Compound Elixir of Taraxacum (F. III), *eight hundred and ten cubic centimeters*	810 Cc.

Mix them, allow the mixture to stand a few days, if convenient, then filter.

Each fluid ounce represents 30 grains of Grindelia.

79. ELIXIR GUARANÆ.

Elixir of Guarana.

Fluid Extract of Guarana (U. S. P.), *two hundred cubic centimeters*	200 Cc.
Aromatic Elixir (U. S. P.), *two hundred cubic centimeters*	200 Cc.
Compound Elixir of Taraxacum (F. 111), *six hundred cubic centimeters*	600 Cc.

Mix them; allow the mixture to stand during forty-eight hours, if convenient, and filter.

Each fluidrachm represents about 12 grains of Guarana.

80. ELIXIR HUMULI.

Elixir of Humulus.

Elixir of Hops.

Fluid Extract of Hops (F. 160), *one hundred and twenty-five cubic centimeters*	125 Cc.
Magnesium Carbonate, *fifteen grammes*	15 Gm.
Tincture of Vanilla (U. S. P.), *thirty cubic centimeters*	30 Cc.
Compound Elixir of Taraxacum (F. 111), *one hundred and twenty-five cubic centimeters*	125 Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Fluid Extract of Hops with the Magnesium Carbonate, then gradually add the Compound Elixir of Taraxacum, Tincture of Vanilla, and enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*. Allow the mixture to stand several days, if convenient, occasionally agitating; then filter.

Each fluidrachm represents 7½ grains of Humulus (*Hops*).

81. ELIXIR HYPOPHOSPHITUM.

Elixir of Hypophosphites.

Calcium Hypophosphite, *fifty-two and one-half grammes*	52.5 Gm.
Sodium Hypophosphite, *seventeen and one-half grammes*	17.5 Gm.
Potassium Hypophosphite, *seventeen and one-half grammes*	17.5 Gm.
Citric Acid, *four grammes*	4 Gm.
Water, *two hundred and fifty cubic centimeters*	250 Cc.
Glycerin, *thirty cubic centimeters*	30 Cc.
Compound Spirit of Cardamom (F. 347), *thirty cubic centimeters*	30 Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Hypophosphites and the Citric Acid in the Water; then add the Glycerin, Compound Spirit of Cardamom, and enough Aro-

matic Elixir to make *one thousand* (1000) *cubic centimeters*. Filter, if necessary.

Each fluidrachm contains 3 grains of Calcium Hypophosphite and 1 grain, each, of Sodium and Potassium Hypophosphite.

82. ELIXIR HYPOPHOSPHITUM CUM FERRO.

Elixir of Hypophosphites with Iron.

Calcium Hypophosphite, *twenty-five grammes*	25 Gm.
Sodium Hypophosphite, *seventeen and one-half grammes*	17.5 Gm.
Potassium Hypophosphite, *eight and one-half grammes*	8.5 Gm.
Sulphate of Iron, in clear crystals, *thirteen grammes*	13 Gm.
Citric Acid, *four grammes*	4 Gm.
Water, *two hundred and fifty cubic centimeters*	250 Cc.
Syrup (U. S. P.), *two hundred and fifty cubic centimeters*	250 Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Hypophosphites in *one hundred and seventy-five* (175) *cubic centimeters* of Water, and add the Syrup. Dissolve the Sulphate of Iron in the remainder of the Water, and mix this with the other solution. Then add *three hundred and fifty* (350) *cubic centimeters* of Aromatic Elixir, set the mixture aside, in a cold place, for twelve hours, and filter from the deposited calcium sulphate. Finally dissolve the Citric Acid in the filtrate, and pass enough Aromatic Elixir through the filter to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm contains about ½ grain of Hypophosphite of Iron (ferrous), about 1 grain, each, of the Hypophosphites of Calcium and Sodium, and ½ grain of Potassium Hypophosphite.

83. ELIXIR LITHII BROMIDI.

Elixir of Lithium Bromide.

Lithium Bromide, *eighty-five grammes*	85 Gm.
Citric Acid, *four grammes*	4 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the solids in about *nine hundred* (900) *cubic centimeters* of Aromatic Elixir, by agitation. Then add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*, and filter.

Each fluidrachm contains about 5 grains of Lithium Bromide.

84. ELIXIR LITHII CITRATIS.

Elixir of Lithium Citrate.

Lithium Citrate, *eighty-five grammes*	85 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Lithium Citrate in about *nine hundred* (900) *cubic centi-*

meters of Aromatic Elixir, by agitation. Then add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*, and filter.

Each fluidrachm contains 5 grains of Lithium Citrate.

85. ELIXIR LITHII SALICYLATIS.

Elixir of Lithium Salicylate.

Lithium Salicylate, *eighty-five grammes*	85 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Lithium Salicylate in about *nine hundred* (900) *cubic centimeters* of Aromatic Elixir, by agitation. Then add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*, and filter.

Each fluidrachm contains 5 grains of Lithium Salicylate.

86. ELIXIR MALTI ET FERRI.

Elixir of Malt and Iron.

Extract of Malt, *two hundred and fifty cubic centimeters*	250	Cc.
Phosphate of Iron (U. S. P.), *seventeen and one-half grammes.*	17.5	Gm.
Water, *thirty cubic centimeters*	30	Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Phosphate of Iron in the Water by the aid of heat, mix the solution with the Extract of Malt previously introduced into a graduated bottle, and add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters.* Set the mixture aside for twenty-four hours, and filter.

Each fluidrachm represents 1 grain of Phosphate of Iron, and 15 minims of Extract of Malt.

Note.—Extract of Malt, most suitable for this preparation, should have about the consistence of Balsam of Peru, at a temperature of about 15° C. (59° F.)

87. ELIXIR PARALDEHYDI.

Elixir of Paraldehyde.

(25 %.)

Paraldehyde, *two hundred and fifty cubic centimeters*	250	Cc.
Glycerin, *one hundred and twenty-five cubic centimeters*	125	Cc.
Alcohol, *three hundred and fifteen cubic centimeters*	315	Cc.
Tincture of Cardamom (U. S. P.), *seventeen and one-half cubic centimeters*	17.5	Cc.
Oil of Orange, *two cubic centimeters*	2	Cc.
Oil of Cinnamon, *two cubic centimeters*	2	Cc.
Compound Tincture of Cudbear (F. 419), *fifteen cubic centimeters*	15	Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Mix the ingredients in the order given, and filter, if necessary.

Each teaspoonful contains about fifteen (15) minims of Paraldehyde.

Note.—Elixir of Paraldehyde varies in strength from 10 to 25% as prescribed in different localities. The formula here given produces a 25% Elixir, and from this the weaker preparations may readily be made by the addition of Aromatic Elixir (U. S. P.), colored with Compound Tincture of Cudbear in the proportion used in the above formula.

To make a 20 % Elixir of Paraldehyde, for instance, 80 Cc. of the 25 % Elixir are mixed with 20 Cc. of colored Aromatic Elixir. To make 100 Cc. of 15% Elixir, 60 Cc. of the 25 % Elixir are required, and to make the same quantity of 10 % Elixir, 40 Cc. of the above Elixir are required.

88. ELIXIR PEPSINI.

Elixir of Pepsin.

Pepsin (U. S. P.), *seventeen and one-half grammes*	17.5	Gm.
Hydrochloric Acid (U. S. P.), *four cubic centimeters*	4	Cc.
Glycerin, *one hundred and twenty-five cubic centimeters*	125	Cc.
Compound Elixir of Taraxacum (F. 111), *sixty-five cubic centimeters*	65	Cc.
Alcohol, *one hundred and seventy-five cubic centimeters*	175	Cc.
Purified Talcum (F. 395), *fifteen grammes*	15	Gm.
Sugar, *two hundred and fifty grammes*	250	Gm.
Water, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Mix the Pepsin with *three hundred and fifty* (350) *cubic centimeters* of Water, add the Glycerin and Acid, and agitate until solution has been effected. Then add the Compound Elixir of Taraxacum, Alcohol, and the Purified Talcum, and mix thoroughly. Set the mixture aside for a few hours, occasionally agitating. Then filter it through a wetted filter, dissolve the Sugar in the filtrate, and pass enough Water through the filter to make the whole product measure *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents 1 grain of Pepsin.

89. ELIXIR PEPSINI, BISMUTHI ET STRYCHNINÆ.

Elixir of Pepsin, Bismuth and Strychnine.

Strychnine Sulphate, *one hundred and seventy-five milligrammes*	0.175	Gm.
Elixir of Pepsin and Bismuth (F. 90), *one thousand cubic centimeters*	1000	Cc.

Dissolve the Strychnine Sulphate in the Elixir.

Each fluidrachm represents $\frac{1}{100}$ grain of Strychnine Sulphate, 1 grain of Pepsin, and 2 grains of Bismuth and Ammonium Citrate.

90. ELIXIR PEPSINI ET BISMUTHI.

Elixir of Pepsin and Bismuth.

Pepsin (U. S. P.), *seventeen and one-half grammes*	17.5	Gm.
Bismuth and Ammonium Citrate, *thirty-five grammes*	35	Gm.
Water of Ammonia (U. S. P.)	a sufficient quantity.	
Glycerin, *one hundred and twenty-five cubic centimeters*	125	Cc.
Alcohol, *one hundred and seventy-five cubic centimeters*	175	Cc.
Syrup (U. S. P.), *two hundred and fifty cubic centimeters*	250	Cc.
Compound Elixir of Taraxacum (F. 111), *sixty-five cubic centimeters*	65	Cc.
Purified Talcum (F. 395), *fifteen grammes*	15	Gm.
Water, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Pepsin in *two hundred and fifty* (250) *cubic centimeters* of Water. Dissolve the Bismuth and Ammonium Citrate in *sixty* (60) *cubic centimeters* of warm Water, allow the solution to stand until clear, if necessary; then decant the clear liquid, and add to the residue just enough Water of Ammonia to dissolve it, carefully avoiding an excess. Then mix the two solutions, and add the Glycerin, Compound Elixir of Taraxacum, and Alcohol. Thoroughly incorporate the Purified Talcum with the mixture, filter it through a wetted filter, and pass enough Water through the filter to make the filtrate measure *seven hundred and fifty* (750) *cubic centimeters*. To this add the Syrup.

Each fluidrachm represents 1 grain of Pepsin, and 2 grains of Bismuth and Ammonium Citrate.

91. ELIXIR PEPSINI ET FERRI.

Elixir of Pepsin and Iron.

Tincture of Citro-Chloride of Iron (F. 407), *seventy-five cubic centimeters*	75	Cc.
Elixir of Pepsin (F. 88), *nine hundred and twenty-five cubic centimeters*	925	Cc.

Mix and filter, if necessary.

Each fluidrachm represents about ½ grain of Chloride of Iron (ferric), and nearly 1 grain of Pepsin.

92. ELIXIR PHOSPHORI ET NUCIS VOMICÆ.

Elixir of Phosphorus and Nux Vomica.

Tincture of Nux Vomica (U. S. P.), *thirty-five cubic centimeters.*	35	Cc.
Elixir of Phosphorus (U. S. P.), *nine hundred and sixty-five cubic centimeters*	965	Cc.

Mix them. This preparation should be freshly made, when wanted for use.

Each fluidrachm represents 2 minims of Tincture of Nux Vomica, and nearly $\frac{1}{50}$ grain of Phosphorus.

93. ELIXIR PICIS COMPOSITUM.

Compound Elixir of Tar.

Syrup of Wild Cherry (U. S. P.), *two hundred cubic centimeters*	200	Cc.
Syrup of Tolu (U. S. P.), *two hundred cubic centimeters*	200	Cc.
Morphine Sulphate, *three hundred and fifty milligrammes*	0.350	Gm.
Methylic Alcohol, *fifty cubic centimeters*	50	Cc.
Water,		
Wine of Tar (F. 451), of each, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Morphine Sulphate in about *eight* (8) *cubic centimeters* of hot Water, and add the solution to the two Syrups previously mixed. Then add the Methylic Alcohol and enough Wine of Tar to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm contains about $\frac{1}{50}$ grain of Morphine Sulphate.

Note.—Much of the commercial "Wood Spirit" or "Wood Naphtha" is unfit for medicinal purposes. Refined Wood Naphtha or Methylic Alcohol should be colorless and freely miscible to a clear liquid with water, alcohol and ether. Its odor, which is characteristic, should be free from empyreuma. It should contain at least 90 per cent. of absolute Methylic Alcohol, which corresponds to a specific gravity of 0.846 at 15° C. (59° F.). On mixing methylic alcohol cautiously with one-fourth its volume of sulphuric acid, the liquid should remain colorless or acquire not more than a very pale yellowish-red tint; and on gently heating methylic alcohol with an equal volume of a 10 % solution of potassa, the mixture should not acquire a brown color.

94. ELIXIR PILOCARPI.

Elixir of Pilocarpus.

Elixir of Jaborandi.

Fluid Extract of Pilocarpus (U. S. P.), *sixty-five cubic centimeters*	65	Cc.
Syrup of Coffee (F. 367), *two hundred cubic centimeters*	200	Cc.
Tincture of Vanilla (U. S. P.), *thirty-five cubic centimeters*	35	Cc.
Compound Elixir of Taraxacum (F. 111), *seven hundred cubic centimeters*	700	Cc.

Mix them, allow the mixture to stand during four days, if convenient, and filter.

Each fluidrachm represents 3¾ grains of Pilocarpus.

95. ELIXIR POTASSII ACETATIS.

Elixir of Potassium Acetate.

Potassium Acetate, *eighty-five grammes*	85	Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Potassium Acetate in *nine hundred* (900) *cubic centimeters*

of Aromatic Elixir, then add enough of the latter to make *one thousand* (1000) *cubic centimeters*. Filter, if necessary.

Each fluidrachm contains about 5 grains of Potassium Acetate.

96. ELIXIR POTASSII ACETATIS ET JUNIPERI.

Elixir of Potassium Acetate and Juniper.

Potassium Acetate, *eighty-five grammes*	85 Gm.
Fluid Extract of Juniper (F. 164), *one hundred and twenty-five cubic centimeters*	125 Cc.
Magnesium Carbonate, *fifteen grammes*	15 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Fluid Extract of Juniper with the Magnesium Carbonate, then add *seven hundred and fifty* (750) *cubic centimeters* of Aromatic Elixir in which the Potassium Acetate has previously been dissolved. Filter, and add enough Aromatic Elixir through the filter, to make *one thousand* (1000) *cubic centimeters*.

Each fluidrachm represents 5 grains of Potassium Acetate, and 7½ grains of Juniper.

97. ELIXIR POTASSII BROMIDI.

Elixir of Potassium Bromide.

Potassium Bromide, *one hundred and seventy-five grammes*	175 Gm.
Citric Acid, *four grammes*	4 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Potassium Bromide and the Citric Acid in about *eight hundred* (800) *cubic centimeters* of Aromatic Elixir, by agitation. Then add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*, and filter.

Each fluidrachm contains 10 grains of Potassium Bromide.

98. ELIXIR QUININÆ COMPOSITUM.

Compound Elixir of Quinine.

Quinine Sulphate, *two grammes*	2 Gm.
Cinchonidine Sulphate, *one gramme*	1 Gm.
Cinchonine Sulphate, *one gramme*	1 Gm.
Aromatic Elixir (U. S. P.), *one thousand cubic centimeters*	1000 Cc.

Add the alkaloidal salts to the Aromatic Elixir, and dissolve them by agitation. Finally filter.

Each fluidounce contains 1 grain of Quinine Sulphate, and ½ grain, each, of Cinchonidine and Cinchonine Sulphate.

Note.—This preparation is intended as a substitute for Elixir of Cinchona in

certain cases, when the presence of other constituents of Cinchona is deemed unnecessary or objectionable.

If it is desired to impart a color to this Elixir, this may be effected by the addition of 16 Cc. of Compound Tincture of Cudbear (F. 419) to the above quantity.

99. ELIXIR QUININÆ ET PHOSPHATUM COMPOSITUM.

Compound Elixir of Quinine and Phosphates.

Quinine Sulphate, *four grammes*	4	Gm.
Phosphate of Iron (U. S. P.), *seventeen and one-half grammes.*	17.5	Gm.
Potassium Citrate, *seventeen and one-half grammes*	17.5	Gm.
Syrup of Calcium Lactophosphate (U. S. P.), *two hundred and fifty cubic centimeters*	250	Cc.
Water, *thirty cubic centimeters*	30	Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Quinine Sulphate in *six hundred* (600) *cubic centimeters* of Aromatic Elixir, if necessary, with the aid of a gentle heat. Dissolve the Phosphate of Iron and the Potassium Citrate in the Water, and add the solution to that first prepared. Then add the Syrup of Calcium Lactophosphate, and lastly, enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters.* Filter, if necessary.

Each fluidrachm contains ¼ grain of Quinine Sulphate, 1 grain of Phosphate of Iron, and about ¾ grain of so-called Calcium Lactophosphate.

100. ELIXIR QUININÆ VALERIANATIS ET STRYCHNINÆ.

Elixir of Quinine Valerianate and Strychnine.

Quinine Valerianate, *seventeen and one-half grammes*	17.5	Gm.
Strychnine Sulphate, *one hundred and seventy-five milligrammes*	0.175	Gm.
Compound Tincture of Cudbear (F. 419), *fifteen cubic centimeters*	15	Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Triturate the Quinine Valerianate and the Strychnine Sulphate with about *five hundred* (500) *cubic centimeters* of Aromatic Elixir, until they are dissolved. Then add the Compound Tincture of Cudbear, and lastly, enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters.* Filter, if necessary.

Each fluidrachm contains 1 grain of Quinine Valerianate, and $\frac{1}{100}$ grain of Strychnine Sulphate.

101. ELIXIR RHAMNI PURSHIANÆ.

Elixir of Rhamnus Purshiana.

Elixir of Cascara Sagrada.

Fluid Extract of Rhamnus Purshiana (U. S. P.), *two hundred and fifty cubic centimeters*	250 Cc.
Compound Elixir of Taraxacum (F. 111), *seven hundred and fifty cubic centimeters*	750 Cc.

Mix them. Allow the mixture to stand a few days, if convenient, and filter.

Each fluidrachm represents 15 grains of Rhamnus Purshiana.

102. ELIXIR RHAMNI PURSHIANÆ COMPOSITUM.

Compound Elixir of Rhamnus Purshiana.

Compound Elixir of Cascara Sagrada; Elixir Laxativum; Laxative Elixir.

Fluid Extract of Rhamnus Purshiana (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Fluid Extract of Senna (U. S. P.), *seventy-five cubic centimeters.*	75 Cc.
Fluid Extract of Juglans (F. 163), *sixty-five cubic centimeters.*	65 Cc.
Compound Elixir of Taraxacum (F. 111), *seven hundred and thirty-five cubic centimeters.*	735 Cc.

Mix them. Allow to stand a few days, if convenient, and filter.

The average dose of this preparation, for an adult, is one (1) to two (2) teaspoonfuls.

103. ELIXIR RHEI.

Elixir of Rhubarb.

Sweet Tincture of Rhubarb (U. S. P.), *five hundred cubic centimeters*	500 Cc.
Deodorized Alcohol, *sixty-five cubic centimeters*	65 Cc.
Water, *one hundred and eighty-five cubic centimeters*	185 Cc.
Glycerin, *one hundred and twenty-five cubic centimeters*	125 Cc.
Syrup (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.

Mix them, and filter.

Each fluidrachm represents about 2¼ grains of Rhubarb.

104. ELIXIR RHEI ET MAGNESII ACETATIS.

Elixir of Rhubarb and Magnesium Acetate.

Elixir Rhei et Magnesiæ. Elixir of Rhubarb and Magnesia.

Magnesia, calcined, *twenty grammes*	20 Gm.
Acetic Acid (U. S. P.)	a sufficient quantity.
Fluid Extract of Rhubarb (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Magnesia in *one hundred and fifty* (150) *cubic centimeters* of Acetic Acid, with the aid of a gentle heat, adding, if necessary, a little more Acetic Acid, drop by drop, until the solution is neutral to test-paper. Then add the Fluid Extract and enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*, and filter.

Each fluidrachm represents about 4 grains of Magnesium Acetate, and 7½ grains of Rhubarb.

105. ELIXIR RUBI COMPOSITUM.

Compound Elixir of Blackberry.

Blackberry Root, *one hundred and sixty grammes*	160 Gm.
Galls, *one hundred and sixty grammes*	160 Gm.
Cinnamon, Saigon, *one hundred and sixty grammes*	160 Gm.
Cloves, *forty grammes*	40 Gm.
Mace, *twenty grammes*	20 Gm.
Ginger, *twenty grammes*	20 Gm.
Blackberry Juice, recently expressed, *thirty-seven hundred and fifty cubic centimeters*	3750 Cc.
Syrup (U. S. P.), *eighteen hundred and seventy-five cubic centimeters*	1875 Cc.
Glycerin, *eighteen hundred and seventy-five cubic centimeters*	1875 Cc.
Diluted Alcohol (U. S. P.), a sufficient quantity	
To make ten thousand cubic centimeters	10000 Cc.

Reduce the solids to a moderately coarse (No. 40) powder, moisten it with Diluted Alcohol, and percolate it with this menstruum in the usual manner, until *twenty-five hundred* (2500) *cubic centimeters* of percolate are obtained. To this add the Blackberry Juice, Syrup and Glycerin, and mix thoroughly.

106. ELIXIR SODII BROMIDI.

Elixir of Sodium Bromide.

Sodium Bromide, *one hundred and seventy-five grammes*	175 Gm.
Citric Acid, *four grammes*	4 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Sodium Bromide and the Citric Acid in about *eight hundred* (800) *cubic centimeters* of Aromatic Elixir, by agitation. Then add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*, and filter, if necessary.

Each fluidrachm contains 10 grains of Sodium Bromide.

107. ELIXIR SODII HYPOPHOSPHITIS.

Elixir of Sodium Hypophosphite.

Sodium Hypophosphite, *thirty-five grammes*	35 Gm.
Citric Acid, *four grammes*	4 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Sodium Hypophosphite and the Citric Acid in about *eight hundred* (800) *cubic centimeters* of Aromatic Elixir, by agitation. Then add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*, and filter, if necessary.

Each fluidrachm contains 2 grains of Sodium Hypophosphite.

108. ELIXIR SODII SALICYLATIS.

Elixir of Sodium Salicylate.

Sodium Salicylate, *eighty-five grammes*	85 Gm.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Sodium Salicylate in about *eight hundred* (800) *cubic centimeters* of Aromatic Elixir, by agitation. Then add enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*, and filter, if necessary.

This preparation should be freshly prepared, when required for use.

Each fluidrachm contains 5 grains of Sodium Salicylate.

109. ELIXIR STILLINGIÆ COMPOSITUM.

Compound Elixir of Stillingia.

Compound Fluid Extract of Stillingia (F. 176), *two hundred and fifty cubic centimeters*	250 Cc.
Aromatic Elixir (U. S. P.), *seven hundred and fifty cubic centimeters*	750 Cc.

Mix them, allow the mixture to stand a few days, or longer, if convenient, and filter.

Each fluidrachm represents 15 minims of Compound Fluid Extract of Stillingia.

110. ELIXIR STRYCHNINÆ VALERIANATIS.

Elixir of Strychnine Valerianate.

Strychnine Valerianate, *one hundred and seventy-five milligrammes*	0.175 Gm.
Acetic Acid (U. S. P.)	a sufficient quantity.
Tincture of Vanilla (U. S. P.), *fifteen cubic centimeters*	15 Cc.
Compound Tincture of Cudbear (F. 419), *fifteen cubic centimeters*	15 Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Strychnine Valerianate with about *sixty* (60) *cubic centimeters* of Aromatic Elixir, gradually added, and effect complete solution by the addition of one or more drops of Acetic Acid, avoiding an excess. Then add the Tinctures, and lastly, enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*. Filter, if necessary.

Each fluidrachm contains $\frac{1}{100}$ grain of Strychnine Valerianate.

111. ELIXIR TARAXACI COMPOSITUM.

Compound Elixir of Taraxacum.

Fluid Extract of Taraxacum (U. S. P.), *thirty-five cubic centimeters*	35 Cc.
Fluid Extract of Wild Cherry (U. S. P.), *twenty cubic centimeters*	20 Cc.
Fluid Extract of Sweet Orange Peel (U. S. P.), *twenty cubic centimeters*	20 Cc.
Fluid Extract of Liquorice (U. S. P.), *sixty cubic centimeters*	60 Cc.
Tincture of Cinnamon (U. S. P.), *thirty-five cubic centimeters*	35 Cc.
Compound Tincture of Cardamom (U. S. P.), *thirty cubic centimeters*	30 Cc.
Aromatic Elixir (U. S. P.), *eight hundred cubic centimeters*	800 Cc.

Mix them. Allow to stand several days, if convenient, and filter.

Note.—If a precipitate should make its appearance in this preparation, it ought to be removed by filtration. This Elixir is chiefly intended as a vehicle or corrigent, to cover the bitter taste of Quinine and similar substances.

112. ELIXIR TURNERÆ.

Elixir of Turnera.

Elixir of Damiana.

Fluid Extract of Turnera (F. 178), *one hundred and fifty cubic centimeters*	150 Cc.
Magnesium Carbonate, *thirty grammes*	30 Gm.
Alcohol, *two hundred and fifty cubic centimeters*	250 Cc.
Glycerin, *sixty-five cubic centimeters*	65 Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Fluid Extract with the Alcohol, Glycerin, and *five hundred* (500) *cubic centimeters* of Aromatic Elixir. Incorporate the Magnesium Carbonate thoroughly with the mixture by trituration. Then filter through a wetted filter, and pass enough Aromatic Elixir through the filter to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents about 9½ grains of Turnera.

113. ELIXIR VIBURNI OPULI COMPOSITUM.

Compound Elixir of Viburnum Opulus.

Compound Elixir of Crampbark.

Fluid Extract of Viburnum Opulus (U. S. P.), *seventy-five cubic centimeters*	75 Cc.
Fluid Extract of Trillium (F. 177), *one hundred and fifty cubic centimeters*	150 Cc.
Fluid Extract of Aletris (F. 137), *seventy-five cubic centimeters.*	75 Cc.
Compound Elixir of Taraxacum (F. 111), *seven hundred cubic centimeters*	700 Cc.

Mix them. Allow the mixture to stand a few days, if convenient, and filter.

114. ELIXIR VIBURNI PRUNIFOLII.

Elixir of Viburnum Prunifolium.

Elixir of Black Haw.

Fluid Extract of Viburnum Prunifolium (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Compound Tincture of Cardamom (U. S. P.), *seventy-five cubic centimeters*	75 Cc.
Aromatic Elixir (U. S. P.), *eight hundred cubic centimeters*	800 Cc.

Mix them. Allow the mixture to stand a few days, if convenient, and filter.

Each fluidrachm represents about 7½ grains of Viburnum Prunifolium.

115. ELIXIR ZINCI VALERIANATIS.

Elixir of Zinc Valerianate.

Zinc Valerianate, *seventeen and one-half grammes*	17.5 Gm.
Stronger Solution of Ammonium Citrate (F. 210), *one hundred cubic centimeters*	100 Cc.
Alcohol, *one hundred and twenty-five cubic centimeters*	125 Cc.
Spirit of Bitter Almond (U. S. P.), *ten cubic centimeters*	10 Cc.
Compound Tincture of Cudbear (F. 419), *fifteen cubic centimeters*	15 Cc.
Aromatic Elixir (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Stronger Solution of Ammonium Citrate with *two hundred and fifty* (250) *cubic centimeters* of Aromatic Elixir and the Alcohol, and triturate the Zinc Valerianate with this mixture, added gradually and in portions, until solution has been effected. Then add the Spirit of Bitter Almond, the Compound Tincture of Cudbear, and finally, enough Aromatic Elixir to make *one thousand* (1000) *cubic centimeters*. Allow the mixture to stand a few days, and filter.

Each fluidrachm contains 1 grain of Zinc Valerianate.

116. EMPLASTRUM AMMONIACI.

(U. S. P., 1880.)

Ammoniac Plaster.

Ammoniac, *one hundred grammes*	100 Gm.
Diluted Acetic Acid, *one hundred and forty cubic centimeters*	140 Cc.

Digest the Ammoniac with the Diluted Acetic Acid, in a suitable vessel, avoiding contact with metals, until it is entirely emulsionized; then strain and evaporate the strained liquid, by means of a water-bath, stirring constantly, until a small portion, taken from the vessel, hardens on cooling.

117. EMPLASTRUM AROMATICUM.

Aromatic Plaster.

Spice Plaster.

Cloves, *ten grammes*	10 Gm.
Cinnamon, Saigon, *ten grammes*	10 Gm.
Ginger, *ten grammes*	10 Gm.
Capsicum, *five grammes*	5 Gm.
Camphor, *five grammes*	5 Gm.
Cotton Seed Oil, *thirty-five grammes*	35 Gm.
Lead Plaster, *twenty-five grammes*	25 Gm.

Melt together the Lead Plaster and Cotton Seed Oil, with the aid of heat. Cool the mixture and, while it is still soft, thoroughly incorporate with it the aromatic ingredients, previously reduced to a very fine powder.

118. EMPLASTRUM ASAFOETIDÆ.

(U. S. P., 1880.)

Asafetida Plaster.

Asafetida, *thirty-five grammes*	35 Gm.
Lead Plaster, *thirty-five grammes*	35 Gm.
Galbanum, *fifteen grammes*	15 Gm.
Yellow Wax, *fifteen grammes*	15 Gm.
Alcohol, *one hundred and twenty cubic centimeters*	120 Cc.

Digest the Asafetida and Galbanum with the Alcohol on a water-bath, separate the liquid portion, while hot, from the coarser impurities by straining, and evaporate it to the consistence of honey; then add the Lead Plaster and the Wax, previously melted together, stir the mixture well, and evaporate to the proper consistence.

119. EMPLASTRUM FUSCUM CAMPHORATUM.

Camphorated Brown Plaster.

Emplastrum Matris Camphoratum; Camphorated Mother Plaster.

Red Oxide of Lead, *three hundred grammes*	300 Gm.
Olive Oil, *six hundred grammes*	600 Gm.
Yellow Wax, *one hundred and fifty grammes*	150 Gm.
Camphor, *ten grammes*	10 Gm.

Triturate the Red Oxide of Lead with a portion of the Oil in a capacious copper kettle until a smooth paste results. Then add the remainder of the Oil, excepting a small quantity required for trituration with the Camphor, and boil the whole over a naked fire, under constant stirring, until gas bubbles rise, or until the red color of the mixture begins to turn brown. Then moderate the heat, but keep up the stirring until the mixture has acquired a dark-brown color, and from time to time allow some drops of it to fall into cold water to test its consistence. When this is satisfactory, remove the vessel from the

fire, add the Wax in small pieces, and finally the Camphor, previously rubbed to a smooth paste with a little Olive Oil. Mix thoroughly, allow the mixture to become somewhat cool, and while it is still warm, pour the plaster into paper-moulds previously coated with mucilage containing about five per cent. of glycerin, and dried.

Note.—This preparation is official in the *German Pharmacopœia.*

120. EMPLASTRUM GALBANI.

(U. S. P., 1880.)

Galbanum Plaster.

Galbanum, *sixteen grammes*	16 Gm.
Turpentine, *two grammes*	2 Gm.
Burgundy Pitch, *six grammes*	6 Gm.
Lead Plaster, *seventy-six grammes*	76 Gm.

To the Galbanum and Turpentine, previously melted together and strained, add, first, the Burgundy Pitch, then the Lead Plaster, melted over a gentle fire, and mix the whole thoroughly.

121. EMPLASTRUM PICIS CANADENSIS.

(U. S. P., 1880.)

Canada Pitch Plaster.

Canada Pitch, *ninety grammes*	90 Gm.
Yellow Wax, *ten grammes*	10 Gm.

Melt them together, strain the mixture, and stir constantly until it thickens on cooling.

122. EMPLASTRUM PICIS LIQUIDÆ COMPOSITUM.

Compound Tar Plaster.

Resin, *fifty grammes*	50 Gm.
Tar, *forty grammes*	40 Gm.
Podophyllum, in No. 60 powder, *ten grammes*	10 Gm.
Phytolacca Root, in No. 60 powder, *ten grammes*	10 Gm.
Sanguinaria, in No. 60 powder, *ten grammes*	10 Gm.

Melt the Resin and Tar together, then stir in the mixed powders, and as the mass cools, mould it into rolls, or pour it into boxes.

123. EMULSIONES.

Emulsions.

The successful formation of Emulsions, whether of fixed or volatile Oils, is most satisfactorily and expeditiously accomplished with Acacia as the emulsifying agent. Hence, preference is given Acacia in this Formulary, though other emulsifying agents are not ignored, and their use and application is exemplified in a number of alternative formulas for preparing Emulsion of Cod-Liver Oil.

A. *Emulsification.* When Acacia is used as the emulsifying agent, it is important that the Oil, the Acacia, and the Water, shall primarily be in absolutely definite proportion to each other *by weight.* This proportion is *eight* (8) *parts* of Oil, *two* (2) *parts* of Acacia, and *three* (3) *parts* of Water. The Oil (8) and Acacia (2), in fine powder, are weighed into a mortar, and well mixed by trituration; the Water (3) is then added *in one portion*, and the whole is triturated briskly until a thick, creamy emulsion is produced, the sides of the mortar being carefully scraped, and the mixture again triturated so as to insure the complete emulsification of all the Oil. During warm weather, the Water and Oil should be cooled. The other ingredients may then be gradually added; first the flavoring, then the greater part of the Water necessary to make the final quantity, then the Syrup, etc. Finally the quantity is adjusted by the addition of sufficient Water.

Alcoholic liquids should be added last, and should be previously mixed with a portion of the Water.

If these simple conditions and directions are carefully observed, and particularly if the proportions by weight are accurate, a perfect Emulsion is obtained with certainty and rapidity.

With other emulsifying agents—Mucilage of Irish Moss, Mucilage of Dextrin, Glycerite of Egg, Tincture of Quillaja—the proportions need not be adjusted with the same minuteness. It suffices to place the emulsifier into a bottle or mortar, and to add the oil in small portions at a time, shaking or triturating briskly after each addition until emulsification is completed. Obviously, the preparation of this class of emulsions is very much facilitated by mechanical contrivances that are capable of producing brisk agitation and mingling of the two fluids, and such are necessarily resorted to when emulsions are to be made in large quantities for the market. But none of them are as perfect as the emulsions made with Acacia.

B. *Flavoring.* Since no single or compound aromatic can be devised which would be acceptable under all circumstances as a flavoring for Emulsion of Cod-Liver Oil, the selection of the most suitable aromatic must be left to the prescriber or dispenser. Among those which are found to be most serviceable are the following, the quantities given below being intended for *one thousand* (1000) *cubic centimeters* of finished emulsion, though in some cases a smaller or a larger quantity, in the same proportions, may be preferable:

1.	**Oil of Gaultheria**, *four cubic centimeters*	4	Cc.
2.	**Oil of Gaultheria**, *two cubic centimeters*	2	Cc.
	Oil of Sassafras, *two cubic centimeters*	2	Cc.
3.	**Compound Spirit of Orange** (U. S. P.), *one and one-half cubic centimeters*	1.5	Cc.

4.	Oil of Gaultheria, *two cubic centimeters*	2 Cc.
	Oil of Bitter Almond, *one-fourth cubic centimeter*	0.25 Cc.
	Oil of Coriander, *one-fourth cubic centimeter*	0.25 Cc.
5.	Oil of Gaultheria, *one and one-half cubic centimeters*	1.5 Cc.
	Oil of Sassafras, *one and one-half cubic centimeters*	1.5 Cc.
	Oil of Bitter Almond, *one-fourth cubic centimeter*	0.25 Cc.
6.	Oil of Gaultheria, *two and one-half cubic centimeters*	2.5 Cc.
	Oil of Bitter Almond, *two and one-half cubic centimeters* . .	2.5 Cc.
7.	Oil of Neroli, *one and one-half cubic centimeters*	1.5 Cc.
	Oil of Bitter Almond, *one and one-half cubic centimeters* . .	1.5 Cc.
	Oil of Cloves, *one-fourth cubic centimeter*	0.25 Cc.

C. *Preservation.* When an Emulsion of Cod-Liver Oil is to be kept for some time, its deterioration may be prevented or retarded by the addition of *sixty-five* (65) *cubic centimeters* of Alcohol in the place of the same quantity of Water, when making *one thousand* (1000) *cubic centimeters* of Emulsion.

124. EMULSIO OLEI MORRHUÆ.

Emulsion of Cod-Liver Oil.

Cod-Liver Oil, *four hundred and sixty-four grammes*	464 Gm.
Acacia, in fine powder, *one hundred and sixteen grammes* . . .	116 Gm.
Syrup of Tolu (U. S. P.), *one hundred cubic centimeters*	100 Cc.
Flavoring (F. 123, B),	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Oil and Acacia together in a mortar. Carefully weigh out *one hundred and seventy-four* (174) *grammes* of Water, and add it *at once* to the mixture of Oil and Acacia, triturating briskly until a thick creamy emulsion is produced. To this add the desired flavoring, the Syrup of Tolu, and enough Water to make *one thousand* (1000) *cubic centimeters* of finished emulsion.

Alternative Formulas. Emulsion of Cod-Liver Oil may also be prepared by any other method capable of emulsifying Oil, the following formulas being given as examples:

1. Irish Moss Emulsion of Cod-Liver Oil.

Cod-Liver Oil, *five hundred cubic centimeters*	500 Cc.
Mucilage of Irish Moss (F. 275), *three hundred and twenty-five cubic centimeters*	325 Cc.
Syrup of Tolu (U. S. P.), *one hundred cubic centimeters*	100 Cc.
Flavoring (F. 123, B.),	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Pour the Mucilage of Irish Moss into a suitable bottle, add the Cod-Liver Oil in divided portions, shaking well after each addition, and,

when a perfect Emulsion is formed, add the Syrup of Tolu, and Flavoring, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters*. Finally, mix the whole thoroughly together.

2. Glyconin Emulsion of Cod-Liver Oil.

Cod-Liver Oil, *five hundred cubic centimeters*	500 Cc.
Glycerite of Yolk of Egg (U. S. P.), *one hundred and seventy-five cubic centimeters*	175 Cc.
Syrup of Tolu (U. S. P.), *one hundred cubic centimeters*	100 Cc.
Flavoring (F. 123, B.),	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Glycerite of Yolk of Egg (Glyconin) in a mortar with the Oil, added in small portions at a time, and thoroughly incorporate each portion before adding the next. Then, continuing the trituration, gradually add the Syrup of Tolu, and Flavoring. Finally add enough Water to make *one thousand* (1000) *cubic centimeters*, and mix the whole thoroughly together.

3. Dextrin Emulsion of Cod-Liver Oil.

Cod-Liver Oil, *five hundred cubic centimeters*	500 Cc.
Mucilage of Dextrin (F. 277), *three hundred and twenty-five cubic centimeters*	325 Cc.
Syrup of Tolu (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Flavoring (F. 123, B.),	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

To the Mucilage of Dextrin contained in a suitable bottle add the Cod-Liver Oil, first in small portions, agitating each time, until the last added portion is emulsified. Then add the Flavoring, the Syrup of Tolu, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters*, and mix the whole thoroughly together.

4. Quillaja Emulsion of Cod-Liver Oil.

Cod-Liver Oil, *five hundred cubic centimeters*	500 Cc.
Tincture of Quillaja (U. S. P.), *sixty-five cubic centimeters*	65 Cc.
Syrup of Tolu (U. S. P.), *one hundred cubic centimeters*	100 Cc.
Flavoring (F. 123, B.),	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Pour the Tincture into a suitable bottle, then add the Cod-Liver Oil in portions of about *one hundred and twenty-five* (125) *cubic centimeters* each, and shake after each addition until a perfect emulsion results.

Next add the Syrup of Tolu, and the Flavoring, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters*. Finally, mix the whole thoroughly together.

An 85-per-cent. Emulsion of Cod-Liver Oil may be prepared by mixing in the manner just prescribed:

Cod-Liver Oil, *eight hundred and fifty cubic centimeters*	850 Cc.
Tincture of Quillaja (U. S. P.), *one hundred cubic centimeters* .	100 Cc.
Flavoring (F. 123, B.),	
Syrup of Tolu (U. S. P.), of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Note.—Emulsion of Cod-Liver Oil made with Quillaja should not be dispensed without the direction or consent of the prescriber.

125. EMULSIO OLEI MORRHUÆ CUM CALCII ET SODII PHOSPHATIBUS.

Emulsion of Cod-Liver Oil with Calcium and Sodium Phosphates.

Emulsion of Cod-Liver Oil with Phosphates of Lime and Soda.

Cod-Liver Oil, *four hundred and sixty-four grammes*	464 Gm.
Acacia, in fine powder, *one hundred and sixteen grammes* . . .	116 Gm.
Calcium Phosphate, *seventeen and one-half grammes*	17.5 Gm.
Sodium Phosphate, *seventeen and one-half grammes*	17.5 Gm.
Syrup of Tolu (U. S. P.), *one hundred cubic centimeters*	100 Cc.
Flavoring (F. 123, B.),	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Emulsify the Oil with the Acacia, and *one hundred and seventy-four* (174) *grammes* of Water, as directed under Emulsio Olei Morrhuæ (F. 124), and add the Flavoring. Then triturate the Salts to a fine powder, incorporate with the Syrup and a portion of the remaining Water, and triturate with the emulsified Oil. Finally, add enough Water to make *one thousand* (1000) *cubic centimeters*, and mix the whole thoroughly together.

126. EMULSIO OLEI MORRHUÆ CUM CALCII LACTOPHOSPHATE.

Emulsion of Cod-Liver Oil with Calcium Lactophosphate.

Emulsion of Cod-Liver Oil with Lactophosphate of Lime.

Cod-Liver Oil, *four hundred and sixty-four grammes*	464 Gm.
Acacia, in fine powder, *one hundred and sixteen grammes* . . .	116 Gm.
Calcium Lactate, *thirty-five grammes*	35 Gm.
Phosphoric Acid (U. S. P., 85 %), *twenty grammes*	20 Gm.
Syrup of Tolu (U. S. P.), *one hundred grammes*	100 Gm.
Flavoring (F. 123, B.),	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Emulsify the Oil with the Acacia, and *one hundred and seventy-four* (174) *grammes* of Water, as directed under Emulsio Olei Morrhuæ (F. 124), and add the Flavoring. Then dissolve the Calcium Lactate in *sixty-five* (65) *cubic centimeters* of Water with the aid of the Phosphoric Acid, add the solution gradually to the Emulsified Oil, then the Syrup, and lastly enough Water to make *one thousand* (1000) *cubic centimeters*. Mix the whole thoroughly.

This Emulsion should be freshly prepared when dispensed.

127. EMULSIO OLEI MORRHUÆ CUM CALCII PHOSPHATE.

Emulsion of Cod-Liver Oil with Calcium Phosphate.

Emulsion of Cod-Liver Oil with Phosphate of Lime.

Cod-Liver Oil, *four hundred and sixty-four grammes*	464 Gm.
Acacia, in fine powder, *one hundred and sixteen grammes* . . .	116 Gm.
Calcium Phosphate, *thirty-five grammes*	35 Gm.
Syrup of Tolu (U. S. P.), *one hundred cubic centimeters*	100 Cc.
Flavoring (F. 123, B.),	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Emulsify the Oil with the Acacia and *one hundred and seventy-four* (174) *grammes* of Water, as directed under Emulsio Olei Morrhuæ (F. 124), and add the Flavoring. Then triturate the Calcium Phosphate with the Syrup and a portion of the remaining Water, add the mixture gradually to the emulsified Oil, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters*. Mix the whole thoroughly.

128. EMULSIO OLEI MORRHUÆ CUM EXTRACTO MALTI.

Emulsion of Cod-Liver Oil with Extract of Malt.

Cod-Liver Oil, *five hundred cubic centimeters*	500 Cc.
Mucilage of Dextrin (F. 277), *one hundred and twenty-five cubic centimeters*	125 Cc.
Extract of Malt, *three hundred and seventy-five cubic centimeters*	375 Cc.

To the Mucilage of Dextrin contained in a suitable bottle, add the Extract of Malt, and mix them thoroughly by agitation. Then gradually add the Cod-Liver Oil, first in small portions, agitating each time until the last-added portion is perfectly incorporated.

Note.—Extract of Malt, most suitable for this preparation, should have about the same consistence as Balsam of Peru, at a temperature of 15° C. (59° F.).

129. EMULSIO OLEI MORRHUÆ CUM HYPOPHOSPHITE.

Emulsion of Cod-Liver Oil with Hypophosphite.

Cod-Liver Oil, *four hundred and sixty-four grammes*	464	Gm.
Acacia, in fine powder, *one hundred and sixteen grammes*	116	Gm.
Any Soluble Hypophosphite, *seventeen and one-half grammes.*	17.5	Gm.
Syrup of Tolu (U. S. P.), *one hundred cubic centimeters*	100	Cc.
Flavoring (F. 123, B.),		
Water, of each, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Emulsify the Oil with the Acacia and *one hundred and seventy-four (174) grammes* of Water, as directed under Emulsio Olei Morrhuæ (F. 124), and add the Flavoring. Then dissolve the Hypophosphite in sufficient Water, mix this solution with the Syrup, and add the mixture gradually to the emulsified Oil. Lastly, add enough Water to make *one thousand (1000) cubic centimeters*, and mix the whole thoroughly.

Note.—If several Hypophosphites are required, equal parts of them may be used, amounting altogether to *seventeen and one-half (17.5) grammes* for the above formula. Varying quantities, larger or smaller than the above, may, of course, be used upon prescription.

130. EMULSIO OLEI MORRHUÆ CUM PRUNO VIRCINIANA.

Emulsion of Cod-Liver Oil with Wild Cherry.

Cod-Liver Oil, *four hundred and sixty-four grammes*	464	Gm.
Acacia, in fine powder, *one hundred and sixteen grammes*	116	Gm.
Fluid Extract of Wild Cherry (U. S. P.), *sixty-five cubic centimeters*	65	Cc.
Syrup of Tolu (U. S. P.), *one hundred cubic centimeters*	100	Cc.
Flavoring (F. 123, B.),		
Water, of each, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Emulsify the Oil with the Acacia, and *one hundred and seventy-four (174) grammes* of Water, as directed under Emulsio Olei Morrhuæ (F. 124), and add the Flavoring. Mix the Fluid Extract and the Syrup with a portion of the remaining Water, and add the mixture gradually to the emulsified Oil. Lastly, add enough Water to make *one thousand (1000) cubic centimeters*, and mix the whole thoroughly.

131. EMULSIO OLEI RICINI.

Emulsion of Castor Oil.

Castor Oil, *thirty-two grammes*	32	Gm.
Acacia, in fine powder, *eight grammes*	8	Gm.
Tincture of Vanilla (U.S.P.), *two and one-half cubic centimeters.*	2.5	Cc.
Syrup (U. S. P.), *twenty cubic centimeters*	20	Cc.
Water, a sufficient quantity		
To make one hundred cubic centimeters	100	Cc.

Carefully weigh the Castor Oil and the Acacia into a mortar, triturate until well mixed; carefully weigh out *twelve* (12) *grammes* of Water, and add *at once* to the mixture of Oil and Acacia, triturating briskly until a thick, creamy emulsion is produced. To this add gradually, with stirring, a mixture of the Syrup and Tincture with a portion of the remaining Water, and finally enough Water to make *one hundred* (100) *cubic centimeters.*

The Emulsion contains about *one-third* (⅓) of its volume of Castor Oil. The flavoring may be varied to suit prescription. It should be freshly prepared as required.

132. EMULSIO OLEI TEREBINTHINÆ.

Emulsion of Oil of Turpentine.

Oil of Turpentine, *twelve and one-half cubic centimeters* . . .	12.5	Cc.
Acacia, in fine powder, *two grammes*	2	Gm.
Yolk of Egg, *fifteen cubic centimeters*	15	Cc.
Aromatic Elixir (U. S. P.), *fifteen cubic centimeters*	15	Cc.
Cinnamon Water (U. S. P.), a sufficient quantity		
To make one hundred cubic centimeters	100	Cc.

Triturate the Acacia with the Yolk of Egg, then add the Oil of Turpentine very slowly, continuing the trituration, and finally add the Aromatic Elixir, and enough Cinnamon Water to make *one hundred* (100) *cubic centimeters* in the same manner.

Emulsion of Oil of Turpentine, or of any *Volatile Oil*, may also be prepared according to the following general formula:

Volatile Oil, *twelve and one-half cubic centimeters*	12.5	Cc.
Acacia, in fine powder, *six grammes*	6	Gm.
Syrup, *twenty-five cubic centimeters*	25	Cc.
Water, a sufficient quantity		
To make one hundred cubic centimeters	100	Cc.

Pour the Volatile Oil into a dry bottle, and, having corked the latter, agitate it so that the inner surface may be completely wetted by the Oil. Then add the Acacia, and shake again. Finally, add the Syrup, and enough Water to make *one hundred* (100) *cubic centimeters*, and mix thoroughly.

Note.—If this general formula is applied to Emulsion of Oil of Turpentine, and a product similar to that obtained by the first formula is desired, the Syrup should be replaced by Aromatic Elixir and the Water by Cinnamon Water.

If a so-called "Emulsion" of a Volatile Oil is to be made more permanent, this may be accomplished by incorporating with it a small portion of some bland fixed Oil, such as Expressed Oil of Almond. Usually, 1 volume of the Fixed Oil will be sufficient for 2 volumes of the Volatile Oil.

In this case, the mixture should be made in a mortar, by trituration, and under observation of the rule laid down in general formula for Emulsions (F. 123).

133. EMULSIO OLEI TEREBINTHINÆ FORTIOR.

Stronger Emulsion of Oil of Turpentine.

Forbes' Emulsion of Oil of Turpentine.

Oil of Turpentine, *fifty cubic centimeters*	50	Cc.
Acacia, in fine powder, *two and one-half grammes*	2.5	Gm.
Water, *fifty cubic centimeters*	50	Cc.

Pour the Oil of Turpentine into a perfectly dry vial, having a capacity of a little more than *one hundred* (100) *cubic centimeters*, and shake so that the inner surface may be completely wetted by the Oil. Then add the Acacia, and shake again. Now add one-half of the Water, and shake until the Oil separates in form of a milky Emulsion. Add the remainder of the Water, and continue the shaking until the Oil separates from the Water in the form of a creamy Emulsion upon standing.

This Emulsion must be shaken before dispensing.

Note.—The formula for this strong Emulsion of Oil of Turpentine is essentially that proposed by Mr. J. Winchell Forbes, in 1872. While the Oil separates in the form of a cream-like layer upon standing, the two liquids are easily united by brief shaking. It keeps well, and is useful for dispensing small quantities of Oil of Turpentine in a fairly well emulsified condition.

134. EMULSIO PHOSPHATICA.

Phosphatic Emulsion.

Mistura Phosphatica.

Cod-Liver Oil, *two hundred and fifty cubic centimeters*	250	Cc.
Glycerite of Yolk of Egg (U. S. P.), *one hundred and sixty-five grammes*	165	Gm.
Diluted Phosphoric Acid (U. S. P.), *fifty cubic centimeters*	50	Cc.
Oil of Bitter Almond, *one and one-half cubic centimeters*	1.5	Cc.
Rum, Jamaica, *two hundred and fifty cubic centimeters*	250	Cc.
Orange Flower Water (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

To the Glycerite of Yolk of Egg (Glyconin) contained in a suitable bottle, gradually add the Cod-Liver Oil, in small portions at a time, shaking after each addition, until the added portion is emulsified. Then gradually add the Phosphoric Acid, Rum, and Oil of Bitter Almond, incorporating them thoroughly. Finally, add enough Orange Flower Water to make *one thousand* (1000) *cubic centimeters*, and mix the whole thoroughly.

135. EXTRACTA FLUIDA.

Fluid Extracts.

The Fluid Extracts for which formulas are given in this Formulary, are intended to be of the same strength as the Fluid Extracts of the

United States Pharmacopœia, which directs that *one hundred* (100) *cubic centimeters* of Fluid Extract shall be obtained from *one hundred* (100) *grammes* of the drug.

General Processes. The Fluid Extracts of this Formulary are to be prepared according to one of the following two processes, the particular one to be employed being designated in each case. These two processes are necessary because, in the preparation of some Fluid Extracts, two fluids are successively used, the first containing Glycerin, and being in definite proportion to the drug used, while the second is free from Glycerin, being intended for the exhaustion of the drug and subsequent evaporation. Accordingly these menstrua are designated as *Menstruum I* (containing Glycerin) and *Menstruum II* (containing no Glycerin). As an alternative to either of these processes, a third process, dependent upon *Fractional Percolation*, may be used. In this the use of heat is avoided, and it involves the use of only one kind of menstruum, even in the case of drugs for which two different menstrua (I and II) are prescribed in this Formulary. In the case of the latter, a sufficient quantity of Menstruum I must be prepared to serve throughout the process.

Process A. The Menstruum contains no Glycerin.

Moisten *one thousand* (1000) *grammes* of the drug with a sufficient quantity of the prescribed menstruum to render it distinctly damp and to maintain it so after several hours' maceration in a well-covered vessel. When the drug has ceased to swell, pack it in a suitable percolator, pour a sufficient quantity of the menstruum on top, and, when the percolate begins to drop from the orifice, close the latter, cover the percolator, and allow the contents to macerate twenty-four hours. Then permit the percolation to proceed. Receive the first *eight hundred and seventy-five* (875) *cubic centimeters* of the percolate separately and set it aside. Then continue the percolation with the same menstruum until the drug is practically exhausted. Evaporate this second portion—at a temperature sufficiently low to prevent the loss of any important volatile constituent—to a soft extract, and dissolve this in a sufficient quantity of menstruum so that when this is added to the reserved portion, the product will measure *one thousand* (1000) *cubic centimeters*. Allow the Fluid Extract to stand a few days, or longer, if convenient, and filter, if necessary.

Process B. The Menstruum contains Glycerin.

Moisten *one thousand* (1000) *grammes* of the drug with a sufficient quantity of Menstruum I to render it distinctly damp and to maintain it so after several hours' maceration in a well-covered vessel. When the drug has ceased to swell, pack it in a suitable percolator and pour

the remainder of Menstruum I on top. When this has just disappeared from the surface, follow it by a sufficient quantity of Menstruum II. As soon as the percolate begins to drop from the orifice, close the latter, cover the percolator, and allow the contents to macerate during twenty-four hours. Then permit the percolation to proceed. Receive the first *eight hundred and seventy-five* (875) *cubic centimeters* of the percolate separately and set it aside. Then continue the percolation with Menstruum II, until the drug is practically exhausted. Evaporate this second portion—at a temperature sufficiently low to prevent the loss of any important volatile constituent—to a soft extract, and dissolve this in a sufficient quantity of Menstruum II, so that when this is added to the reserved portion, the product will measure *one thousand* (1000) *cubic centimeters*. Allow the Fluid Extract to stand a few days, or longer, if convenient, and filter, if necessary.

Process C. Fractional Percolation.

Take of the Drug, in powder of the prescribed fineness, *one thousand* (1000) *grammes*, and divide it into three portions, of *five hundred* (500), *three hundred and twenty-five* (325) and *one hundred and seventy-five* (175) *grammes*, respectively.

Moisten the first portion of the drug (500 Gm.) with the menstruum and percolate in the usual manner. Set aside the first *one hundred and seventy-five* (175) *cubic centimeters* of percolate, and continue until *fifteen hundred* (1500) *cubic centimeters* more of percolate have passed, which must be received in several portions, so that the more concentrated will be separate from the last, weak percolate.

Then moisten the second portion of the drug (325 Gm.) with the more concentrated percolates received during the preceding operation after the first *one hundred and seventy-five* (175) *cubic centimeters* have passed, and percolate again in the usual manner, using the several reserved percolates, successively, as menstrua. Set aside the first *three hundred and twenty-five* (325) *cubic centimeters*, and continue the percolation until *six hundred and fifty* (650) *cubic centimeters* more have passed, which should also be received in several portions.

Finally moisten the third portion of the drug (175 Gm.) with the most concentrated of the last reserved percolates, and proceed as directed for the second portion. Collect *five hundred* (500) *cubic centimeters* of percolate, and mix with the two portions (325 and 175 Cc.) previously set aside, so as to make *one thousand* (1000) *cubic centimeters* of Fluid Extract.

Note.—If this method is applied to drugs for which the Process B. is directed, use a sufficient quantity of Menstruum I to obtain the required quantities of percolate, and omit the use of Menstruum II.

136. EXTRACTUM ADONIDIS FLUIDUM.

Fluid Extract of Adonis.

From the root of *Adonis vernalis* Linné (Bird's Eye).

Process A (see F. 135).—No. 60 powder.
Menstruum: Alcohol.

137. EXTRACTUM ALETRIDIS FLUIDUM.

Fluid Extract of Aletris.

From the rhizome of *Aletris farinosa* Linné (Stargrass).

Process A (see F. 135).—No. 60 powder.
Menstruum: Diluted Alcohol.

138. EXTRACTUM ANGELICÆ RADICIS FLUIDUM.

Fluid Extract of Angelica Root.

From the root of *Angelica Archangelica* Linné (Angelica).

Process A (see F. 135).—No. 60 powder.
Menstruum: Alcohol, 3 volumes.
Water, 2 volumes.

139. EXTRACTUM APII GRAVEOLENTIS FLUIDUM.

Fluid Extract of Celery.

From the seed of *Apium graveolens* Linné (Celery).

Process A (see F. 135).—No. 60 powder.
Menstruum: Alcohol, 2 volumes.
Water, 1 volume.

140. EXTRACTUM ARALIÆ RACEMOSÆ FLUIDUM.

Fluid Extract of Aralia Racemosa.

From the root of *Aralia racemosa* Linné (American Spikenard).

Process A (see F. 135).—No. 60 powder.
Menstruum: Alcohol, 2 volumes.
Water, 1 volume.

141. EXTRACTUM ARNICÆ FLORUM FLUIDUM.

Fluid Extract of Arnica Flowers.

From the flower heads of *Arnica montana* Linné (Arnica).

Process A (see F. 135).—No. 40 powder.
Menstruum: Diluted Alcohol.

142. EXTRACTUM BERBERIDIS VULGARIS FLUIDUM.

Fluid Extract of Berberis Vulgaris.

From the bark of the root of *Berberis vulgaris* Linné (Barberry).

Process A (see F. 135).—No. 60 powder.
Menstruum: Alcohol, 3 volumes.
Water, 2 volumes.

143. EXTRACTUM BOLDI FLUIDUM.

Fluid Extract of Boldo.

From the leaves of *Peumus Boldus* Molina (Boldo).

Process A (see F. 135).—No. 60 powder.
Menstruum: Alcohol, 2 volumes.
Water, 1 volume.

144. EXTRACTUM BUCHU FLUIDUM COMPOSITUM.

Compound Fluid Extract of Buchu.

Buchu, *six hundred and twenty five grammes*	625 Gm.
Cubeb, *one hundred and twenty-five grammes*	125 Gm.
Juniper, *one hundred and twenty-five grammes*	125 Gm.
Uva Ursi, *one hundred and twenty-five grammes*	125 Gm.

Process A (see F. 135).—No. 40 powder.
Menstruum: Alcohol, 2 volumes.
Water, 1 volume.

145. EXTRACTUM CALENDULÆ FLUIDUM.

Fluid Extract of Calendula.

From the flowering herb of *Calendula officinalis* Linné (Marigold).

Process A (see F. 135).—No. 40 powder.
Menstruum: Alcohol, 2 volumes.
Water, 1 volume.

146. EXTRACTUM CAMELLIÆ FLUIDUM.

Fluid Extract of Camellia.

From the commercial dried leaves of *Camellia Thea* Link (Tea).

Process B (see F. 135).—No. 40 powder.
Menstruum I: Alcohol, *two hundred and fifty* (250) *cubic centimeters.*
Water, *six hundred and eighty-five* (685) *cubic centimeters.*
Glycerin, *sixty-five* (65) *cubic centimeters.*
Menstruum II: Alcohol, 1 volume.
Water, 3 volumes.

Note.—It is recommended that the best quality of commercial black tea, preferably "Formosa Oolong," be employed for this preparation.

147. EXTRACTUM CAULOPHYLLI FLUIDUM.

Fluid Extract of Caulophyllum.

From the rhizome and rootlets of *Caulophyllum thalictroides* Michaux (Blue Cohosh).

Process A (see F. 135).—No. 60 powder.
Menstruum: Alcohol, 3 volumes.
Water, 1 volume.

148. EXTRACTUM COFFEÆ VIRIDIS FLUIDUM.

Fluid Extract of Green Coffee.

From the commercial, unroasted seeds of *Coffea arabica* Linné (Coffee).

Process B (see F. 135).—No. 20 powder.
Menstruum I: Alcohol, *two hundred and fifty* (250) *cubic centimeters.*
Water, *six hundred and eighty-five* (685) *cubic centimeters.*
Glycerin, *sixty-five* (65) *cubic centimeters.*
Menstruum II: Alcohol, 1 volume.
Water, 3 volumes.

Note.—It is recommended that the best quality of either of the commercial varieties known as "Java," or "Mocha" Coffee be employed for this preparation.

149. EXTRACTUM COFFEÆ TOSTÆ FLUIDUM.

Fluid Extract of Roasted Coffee.

From the commercial roasted seeds of *Coffea arabica* Linné (Coffee).

Process B (see F. 135).—No. 20 powder.
Menstruum I: Alcohol, *two hundred and fifty* (250) *cubic centimeters.*
Water, *six hundred and eighty-five* (685) *cubic centimeters.*
Glycerin, *sixty-five* (65) *cubic centimeters.*
Menstruum II: Alcohol, 1 volume.
Water, 3 volumes.

Note.—See the note to the preceding.

150. EXTRACTUM CONVALLARIÆ FLORUM FLUIDUM.

Fluid Extract of Convallaria Flowers.

From the flowers of *Convallaria majalis* Linné (Lily of the Valley).

Process A (see F. 135).—No. 40 powder.
Menstruum: Diluted Alcohol.

151. EXTRACTUM COPTIS FLUIDUM.

Fluid Extract of Coptis

From the rhizome and rootlets of *Coptis trifolia* Salisbury (Goldthread).

Process A (see F. 135).—No. 40 powder.
Menstruum: Diluted Alcohol.

152. EXTRACTUM CORNUS FLUIDUM.

(U. S. P., 1880).

Fluid Extract of Cornus.

From the bark of the root of *Cornus Florida* Linné (Dogwood).

Process B (see F. 135).—No. 60 powder.
Menstruum I: Glycerin, *one hundred and fifty* (150) *cubic centimeters.*
Diluted Alcohol, *eight hundred and fifty* (850) *cubic centimeters.*
Menstruum II: Diluted Alcohol.

153. EXTRACTUM CORNUS CIRCINATÆ FLUIDUM.

Fluid Extract of Cornus Circinata.

From the bark of *Cornus circinata* L'Héritier (Green Osier).

Process A (see F. 135).—No. 40 powder.
Menstruum: Diluted Alcohol.

154. EXTRACTUM CORYDALIS FLUIDUM.

Fluid Extract of Corydalis.

From the tubers of *Dicentra canadensis* De Candolle (Turkey Corn).

Process A (see F. 135).—No. 60 powder.
Menstruum: Alcohol, 3 volumes.
Water, 1 volume.

155. EXTRACTUM COTO FLUIDUM.

Fluid Extract of Coto.

From Coto bark, derived from an undetermined tree, native of tropical South America.

Process A (see F. 135).—No. 60 powder.
Menstruum: Alcohol, 9 volumes.
Water, 1 volume.

156. EXTRACTUM FERRI POMATUM.

Ferrated Extract of Apples.

Ferri Malas Crudus. Crude Malate of Iron.

Iron, in the form of fine, bright wire, and cut, *twenty grammes.* **20 Gm.**
Ripe Sour Apples, *one thousand grammes* . . . . . **1000 Gm.**
Water . . . . . **a sufficient quantity.**

Convert the Sour Apples into a homogeneous pulp by pounding or grinding, and express the liquid portion. Then mix the latter with the Iron in an enameled or porcelain vessel, macerate for forty-eight hours, and then apply the heat of a water-bath, until no more bubbles of gas are given off, adding a little water from time to time to make up any loss by evaporation. Dilute the liquid with Water to make it weigh *one thousand* (1000) *grammes*, and set it aside for a few days. Then filter, and evaporate the filtrate in the before-mentioned vessel to a thick extract, which should be greenish-black, and should yield a clear solution with water.

Note.—This preparation is inserted here with the title under which it is contained in the German Pharmacopœia. In some others it is called more correctly, *Extractum Pomi* (or *Pomorum*) *Ferratum*.

157. EXTRACTUM FUCI FLUIDUM.

Fluid Extract of Fucus.

From the thallus of *Fucus vesiculosus* Linné (Bladder-wrack).

Process A (see F. 135).—No. 40 powder.

Menstruum: Alcohol, 3 volumes.
Water, 1 volume.

158. EXTRACTUM GLYCYRRHIZÆ DEPURATUM.

Purified Extract of Glycyrrhiza.

Purified Extract of Liquorice.

Extract of Glycyrrhiza, in sticks,
Water, each . . . . . **a sufficient quantity.**

Put a layer of well-washed rye-straw over the bottom of a keg or other suitable tall vessel. Then put a single layer of sticks of Extract of Glycyrrhiza, broken into coarse pieces, over it. Continue to put in alternate layers of straw and Extract of Glycyrrhiza until the vessel is full or the whole of the Extract has been disposed of. Fill the vessel with cold Water, and allow it to remain for three days. Then draw off the solution which has formed, by means of a faucet, or siphon, or otherwise, refill the vessel with cold Water, and proceed as before. Mix the several solutions obtained, allow any suspended matter to subside, decant the clear solution, and strain the remainder without pressure. Finally evaporate the liquid on a water-bath to the consistence of a pilular extract.

Note.—Purified Extract of Glycyrrhiza should not be confounded with the official Pure Extract of Glycyrrhiza (*Extractum Glycyrrhizæ Purum*).

159. EXTRACTUM HELIANTHEMI FLUIDUM.

Fluid Extract of Helianthemum.

From the herb of *Helianthemum canadense* Michaux (Frost-wort).

Process A (see F. 135).—No. 40 powder.
Menstruum: Diluted Alcohol.

160. EXTRACTUM HUMULI FLUIDUM.

Fluid Extract of Hops.

From the strobiles of *Humulus Lupulus* Linné (Hops).

Process A (see F. 135).—No. 20 powder.
Menstruum: Alcohol, 5 volumes.
Water, 3 volumes.

161. EXTRACTUM HYDRANGEÆ FLUIDUM.

Fluid Extract of Hydrangea.

From the root of *Hydrangea arborescens* Linné (Seven Barks).

Process A (see F. 135).—No. 60 powder.
Menstruum: Alcohol, 3 volumes.
Water, 2 volumes.

162. EXTRACTUM JALAPÆ FLUIDUM.

Fluid Extract of Jalap.

From the tuberous root of *Exogonium Purga* Bentham (Jalap).

Process A (see F. 135).—No 60 powder.
Menstruum: Alcohol.

163. EXTRACTUM JUGLANDIS FLUIDUM.

Fluid Extract of Juglans.

From the inner bark of the root of *Juglans cinerea* Linné (Butternut).

Process A (see F. 135).—No. 40 powder.
Menstruum: Diluted Alcohol.

164. EXTRACTUM JUNIPERI FLUIDUM.

Fluid Extract of Juniper.

From the fruit of *Juniperus communis* Linné (Juniper).

Process A (see F. 135).—No. 10 powder.
Menstruum: Diluted Alcohol.

165. EXTRACTUM KAVÆ FLUIDUM.

Fluid Extract of Kava.

From the root of *Piper methysticum* Forster (Kava; Kava-kava; Ava).

Process A (see F. 135).—No. 40 powder.

Menstruum: Alcohol, 3 volumes.
Water, 2 volumes.

166. EXTRACTUM LACTUCARII FLUIDUM.

(U. S. P., 1880).

Fluid Extract of Lactucarium.

Lactucarium, in coarse pieces, *one hundred grammes*	**100 Gm.**
Ether, *one hundred and twenty-five cubic centimeters*	**125 Cc.**
Alcohol,	
Water, each	**a sufficient quantity.**

Add the Lactucarium to the Ether contained in a tared flask having the capacity of *six hundred* (600) *cubic centimeters*, and let it macerate for twenty-four hours; then add *three hundred* (300) *cubic centimeters* of Water, and shake the mixture well. Fit a bent glass tube into the neck of the flask, and, having immersed the flask in hot water, recover the Ether by distillation. When all the Ether has distilled over, remove the tube, and, after thoroughly shaking the contents of the flask, continue the heat for half an hour. Let the mixture cool, add *one hundred* (100) *grammes* of Alcohol, and enough Water to make the whole mixture weigh *five hundred* (500) *grammes;* after maceration for twenty-four hours, with occasional agitation, express and filter the liquid. Return the dregs to the flask and macerate them with *two hundred* (200) *grammes* of a mixture of Alcohol and Water made in the proportion of *one* (1) *part* of Alcohol to *three* (3) *parts* of Water; repeat the maceration two or three times, successively, with fresh portions of the mixture, until the dregs are tasteless, or nearly so. Mix, and filter the liquids thus obtained, and concentrate them, by means of a water-bath (the first expressed liquid by itself), until the combined weight of the liquids is *sixty* (60) *grammes;* mix the liquids, add *forty* (40) *grammes* of Alcohol, and let the mixture cool in the evaporating vessel, stirring the mixture frequently, and during the intervals keeping the vessel well covered. When cool, add enough Alcohol to make the mixture weigh *one hundred* (100) *grammes*, transfer the liquid to a flask, and add enough Water to make the mixture measure *one hundred* (100) *cubic centimeters*, using the Water so required to rinse the evaporating vessel. Shake the mixture occasionally, during several hours (and frequently, if a portion of the precipitate is found to be tenacious), and, when a uniform mixture results, set it aside for twenty-

four hours, so that any precipitate formed may subside. Decant the clear liquid, transfer the precipitate to a filter, and, after thoroughly draining it into the decanted liquid, wash it with a mixture of Alcohol and Water made in the proportion of *three* (3) *parts* of Alcohol to *four* (4) *parts* of Water, until the washings pass tasteless. Concentrate the washings, by evaporation, to a syrupy consistence, mix with the decanted liquid, and add enough of the last-named mixture of Alcohol and Water to make the whole measure *one hundred* (100) *cubic centimeters*. Lastly, after twenty-four hours, having meanwhile shaken the Fluid Extract occasionally, filter it through paper.

167. EXTRACTUM MALTI.

(U. S. P., 1880.)

Extract of Malt.

Malt, in coarse powder, not finer than No. 12, *one thousand grammes* . . . . . **1000 Gm.**
Water . . . . . **a sufficient quantity.**

Upon the powder, contained in a suitable vessel, pour *one thousand* (1000) *cubic centimeters* of Water, and macerate for six hours. Then add *four thousand* (4000) *cubic centimeters* of Water, heated to about 30° C. (86° F.), and digest for an hour at a temperature not exceeding 55° C. (131° F.). Strain the mixture with strong expression. Finally, by means of a water-bath, or vacuum-apparatus, at a temperature not exceeding 55° C. (131° F.), evaporate the strained liquid rapidly to the consistence of thick honey.

Keep the product in well-closed vessels, in a cool place.

168. EXTRACTUM MALTI FLUIDUM.

Fluid Extract of Malt.

Malt, *one thousand grammes* . . . . . **1000 Gm.**
Alcohol,
Water, each . . . . . **a sufficient quantity.**

Reduce the Malt to a coarse powder, not finer than No. 20. Moisten it with *five hundred* (500) *cubic centimeters* of a mixture of *one* (1) *volume* of Alcohol and *three* (3) *volumes* of Water, and set it aside, well-covered, until it has ceased to swell. Then mix it with as much of the menstruum as it will take up without dripping, pack it uniformly, but without pressure, in a percolator, and add enough of the before-mentioned menstruum to cover it. When the liquid begins to drop from the orifice, close the latter, and allow the contents to macerate during twenty-four hours, adding from time to time more menstruum, if necessary, to keep the malt just covered. Then remove the cork and

allow the percolation to proceed until the percolate weighs *seven hundred and fifty* (750) *grammes*. Set this aside, well-corked, until any suspended matters have been deposited. Then decant the clear liquid and preserve it for use.

Note.—The product thus obtained may be regarded as being practically equivalent to the drug in the proportion of minim for grain, the apparent excess of dissolved matters present in the first portions of the percolate being about offset by the soluble matters still remaining in the drug, when the percolation is interrupted.

169. EXTRACTUM MENYANTHIS FLUIDUM.

Fluid Extract of Menyanthes.

From the leaves of *Menyanthes trifoliata* Linné (Buckbean.—Trifolium fibrinum *Germ. Pharm.*)

Process A (see F. 135).—No. 20 powder.
Menstruum: Diluted Alcohol.

170. EXTRACTUM MEZEREI FLUIDUM.

(U. S. P., 1880.)

Fluid Extract of Mezereum.

From the bark of *Daphne Mezereum* Linné, and of other species of *Daphne* (*Mezereum*).

Process A (see F. 135).—No. 30 powder.
Menstruum: Alcohol.

171. EXTRACTUM PETROSELINI RADICIS FLUIDUM.

Fluid Extract of Parsley Root.

From the root of *Petroselinum sativum* Hoffmann (Parsley).

Process A (see F. 135).—No. 40 powder.
Menstruum: Diluted Alcohol.

172. EXTRACTUM QUILLAJÆ FLUIDUM.

Fluid Extract of Quillaja.

From the bark of *Quillaja Saponaria* Molina (Soap-Bark).

Process A (see F. 135).—No. 40 powder.
Menstruum: Diluted Alcohol.

173. EXTRACTUM RHAMNI PURSHIANÆ FLUIDUM AROMATICUM.

Aromatic Fluid Extract of Rhamnus Purshiana.

Aromatic Fluid Extract of Cascara Sagrada.

Rhamnus Purshiana, in No. 60 powder, *one thousand grammes.*	1000 Gm.
Glycyrrhiza, in No. 40 powder, *one hundred grammes*	100 Gm.
Calcined Magnesia, *one hundred and twenty-five grammes* . .	125 Gm.
Glycerin, *two hundred and fifty cubic centimeters*	250 Cc.
Compound Spirit of Orange (U. S. P.), *ten cubic centimeters* .	10 Cc.
Alcohol, *five hundred cubic centimeters*	500 Cc.
Water,	
Diluted Alcohol (U. S. P.), of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the powdered drugs and the Magnesia with *two thousand* (2000) *cubic centimeters* of Water; macerate for twelve hours and then dry the mixture on a water-bath at a gentle heat. Mix the Glycerin and the Alcohol with *two hundred and fifty* (250) *cubic centimeters* of Water, and percolate the dried powders with this menstruum, followed by Diluted Alcohol according to the directions given under Process B (see F. 135). Reserve the first *eight hundred and fifty* (850) *cubic centimeters* that pass, and set this aside. Continue the percolation with Diluted Alcohol to practical exhaustion, evaporate this second portion to a soft extract, dissolve it in the reserved portion, and add the Compound Spirit of Orange and sufficient Diluted Alcohol to make *one thousand* (1000) *cubic centimeters* of Fluid Extract.

174. EXTRACTUM SENNÆ FLUIDUM DEODORATUM.

Deodorized Fluid Extract of Senna.

Senna, in No. 60 powder, *one thousand grammes*	1000 Gm.
Alcohol,	
Water, each	a sufficient quantity.

Moisten the Senna with *three hundred and fifty* (350) *cubic centimeters* of Alcohol, pack it firmly in a percolator, and percolate it with Alcohol until it is practically exhausted by this menstruum. The alcoholic percolate thus obtained is rejected, and the alcohol may be recovered therefrom by distillation. Then take out the moist powder, dry it, and prepare a Fluid Extract by the Process and Menstruum below-mentioned:

Process A (see F. 135).
Menstruum: Diluted Alcohol.

175. EXTRACTUM STERCULIÆ FLUIDUM.

Fluid Extract of Sterculia.

From the seeds of *Sterculia acuminata* R. Brown (Cola; Kola).

Process B (see F. 135).—No. 20 powder.

Menstruum I: Alcohol, *two hundred and fifty* (250) *cubic centimeters.*
Water, *six hundred and eighty-five* (685) *cubic centimeters.*
Glycerin, *sixty-five* (65) *cubic centimeters.*

Menstruum II: Alcohol, 1 volume.
Water, 3 volumes.

176. EXTRACTUM STILLINGIÆ FLUIDUM COMPOSITUM.

Compound Fluid Extract of Stillingia.

Stillingia, *two hundred and fifty grammes*	250 Gm.
Corydalis (root), *two hundred and fifty grammes*	250 Gm.
Iris, *one hundred and twenty-five grammes*	125 Gm.
Sambucus, *one hundred and twenty-five grammes*	125 Gm.
Chimaphila, *one hundred and twenty-five grammes*	125 Gm.
Coriander, *sixty-five grammes*	65 Gm.
Xanthoxylum Berries, *sixty grammes*	60 Gm.

Reduce the drugs to a moderately coarse (No. 40) powder, and prepare a Fluid Extract in the usual manner, by the Process and Menstrua below mentioned.

Process B (see F. 135).

Menstruum I: Alcohol, *five hundred* (500) *cubic centimeters.*
Glycerin, *two hundred and fifty* (250) *cubic centimeters.*
Water, *two hundred and fifty* (250) *cubic centimeters.*

Menstruum II: Diluted Alcohol.

177. EXTRACTUM TRILLII FLUIDUM.

Fluid Extract of Trillium.

From the rhizome of *Trillium erectum* Linné, and other species of *Trillium* (Bethroot).

Process A (see F. 135).—No. 40 powder.

Menstruum: Alcohol, 3 volumes.
Water, 2 volumes.

178. EXTRACTUM TURNERÆ FLUIDUM.

Fluid Extract of Turnera.

From the leaves of *Turnera microphylla* De Candolle, and other species of *Turnera* (Damiana).

Process A (see F. 135).—No. 20 powder.

Menstruum: Alcohol, 2 volumes.
Water, 1 volume.

179. EXTRACTUM URTICÆ FLUIDUM.

Fluid Extract of Urtica.

From the root of *Urtica dioica* Linné (Nettle).

Process A (see F. 135).—No. 40 powder.
Menstruum: Diluted Alcohol.

180. EXTRACTUM VERBASCI FLUIDUM.

Fluid Extract of Verbascum.

From the leaves and flowers of *Verbascum Thapsus* Linné (Mullein).

Process A (see F. 135).—No. 20 powder.
Menstruum: Diluted Alcohol.

181. EXTRACTUM VERBENÆ FLUIDUM.

Fluid Extract of Verbena.

From the root of *Verbena hastata* Linné (Vervain).

Process A (see F. 135).—No. 40 powder.
Menstruum: Diluted Alcohol.

182. EXTRACTUM ZEÆ FLUIDUM.

Fluid Extract of Zea.

Extractum Stigmatum Maydis Fluidum. Fluid Extract of Corn Silk.

From the stigmata of *Zea Mays* Linné (Indian Corn).

Process A (see F. 135).—No. 40 powder.
Menstruum: Diluted Alcohol.

183. FERRI HYPOPHOSPHIS.

Hypophosphite of Iron.

Ferric Hypophosphite.

Iron and Ammonium Sulphate (U. S. P.), in perfect crystals, *one hundred grammes*	**100 Gm.**
Sodium Hypophosphite, *sixty-seven grammes*	**67 Gm.**
Distilled Water	**a sufficient quantity.**

Dissolve the Iron and Ammonium Sulphate in *four hundred* (400) *cubic centimeters*, and the Sodium Hypophosphite in *one hundred and twenty-five* (125) *cubic centimeters* of Distilled Water, and, if necessary, filter each solution. Then mix them, and stir thoroughly; after a short time transfer the mixture to a close linen or muslin strainer, and wash the precipitate with Distilled Water, until the washings run off tasteless. Transfer the strainer to a warm place and, when the contents are dry, preserve them for use.

Hypophosphite of Iron (ferric) may also be prepared in the following manner:

Calcium Hypophosphite, *one hundred grammes* . . . . . 100 Gm.
Solution of Chloride of Iron (U. S. P.),
Distilled Water, of each . . . . . a sufficient quantity.

Dissolve the Calcium Hypophosphite in *twelve hundred* (1200) *cubic centimeters* of Distilled Water, and filter the solution. To this add Solution of Chloride of Iron, in small portions, stirring well each time and allowing the precipitate to subside before adding a fresh portion. Toward the end, remove a small quantity of the clear supernatant liquid, add to it some Solution of Chloride of Iron diluted with ten times its volume of Water, and observe whether any turbidity occurs either at once or after a few minutes. If it remains clear, the precipitation may be regarded as complete. Then transfer the mixture to a close linen or muslin strainer, and wash the precipitate with Distilled Water, until the washings run off tasteless. Transfer the strainer to a warm place and, when the contents are dry, preserve them for use.

Note.—Hypophosphite of Iron is rendered soluble in water by mixing it with about an equal weight of potassium citrate or some other alkali citrate. Theoretically, 100 grammes of Iron and Ammonium Sulphate will yield 51.9 grammes, and 100 grammes of Calcium Hypophosphite will yield 85.3 grammes of dry Hypophosphite of Iron (ferric).

184. GELATINUM CHONDRI.

Irish Moss Gelatin.

Irish Moss, *one thousand grammes* . . . . . 1000 Gm.
Water . . . . . a sufficient quantity.

Wash the Irish Moss with cold Water, then place it in a suitable vessel, add *fifty thousand* (50,000) *cubic centimeters* of hot Water, and heat it on a boiling water-bath, for fifteen minutes, frequently stirring. Strain the decoction, while hot, through a strong muslin strainer; return the strained, mucilaginous liquid to the water-bath, evaporate it to a semi-fluid consistence, then transfer it to shallow, flat-bottomed trays, and evaporate it at a temperature not exceeding 90° C. (194° F.), so that the Gelatin may become detached in scales.

Note.—Irish Moss Gelatin thus prepared furnishes a Mucilage of Irish Moss which is opaque, like that made directly from the Moss itself. It may be prepared so as to yield a transparent mucilage by following the plan pointed out in the *Note* to *Mucilago Chondri* (F. 275).

185. GLYCERITUM BISMUTHI.

Glycerite of Bismuth.

Liquor Bismuthi Concentratus. Concentrated Solution of Bismuth.

Bismuth and Ammonium Citrate, *two hundred and seventy-five grammes* . . . . . 275 Gm.
Stronger Water of Ammonia (U. S. P.) . . . . . a sufficient quantity.
Glycerin, *five hundred cubic centimeters* . . . . . 500 Cc.
Water, a sufficient quantity

To make one thousand cubic centimeters . . . . . 1000 Cc.

Triturate the Bismuth and Ammonium Citrate with *three hundred and fifty* (350) *cubic centimeters* of Water and *two hundred and fifty* (250) *cubic centimeters* of Glycerin, and add to it gradually just enough Stronger Water of Ammonia to dissolve the Salt, and to produce a neutral solution. Then add the remainder of the Glycerin and enough Water to make *one thousand* (1000) *cubic centimeters*, and filter.

Each fluidrachm contains 16 grains of Bismuth and Ammonium Citrate.

Note.—If Glycerite of Bismuth should at any time deposit a precipitate, this may be re-dissolved by the addition of just sufficient Stronger Water of Ammonia.

186. GLYCERITUM GUAIACI.

Glycerite of Guaiac.

Guaiac (U. S. P.), in powder, *eighty-five grammes*	85 Gm.
Solution of Potassa (U. S. P.), *sixty-five cubic centimeters*	65 Cc.
Glycerin, *six hundred cubic centimeters*	600 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Solution of Potassa with *three hundred* (300) *cubic centimeters* of Water, add the powdered Guaiac, and macerate for 24 hours with occasional agitation. Then filter, add the Glycerin and sufficient Water to make *one thousand* (1000) *cubic centimeters.*

187. GLYCERITUM PEPSINI.

Glycerite of Pepsin.

Pepsin (U. S. P.), *eighty-five grammes*	85 Gm.
Hydrochloric Acid (U. S. P.), *ten cubic centimeters*	10 Cc.
Purified Talcum (F. 395), *fifteen grammes*	15 Gm.
Glycerin, *five hundred cubic centimeters*	500 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Pepsin with *four hundred and fifty* (450) *cubic centimeters* of Water and the Hydrochloric Acid, and agitate until solution has been effected. Then incorporate the Purified Talcum with the liquid, filter, returning the first portions of the filtrate until it runs through clear, and pass enough Water through the filter to make the filtrate measure *five hundred* (500) *cubic centimeters.* To this add the Glycerin, and mix.

Each fluidrachm represents 5 grains of Pepsin (U. S. P.).

Note.—For filtering the aqueous solution of Pepsin first obtained by the above formula, as well as for filtering other liquids of a viscid character, a filter paper of loose texture (preferably that known as "Textile Filtering Paper"), or a layer of absorbent cotton placed in a funnel, or percolator, should be employed.

188. GLYCERITUM PICIS LIQUIDÆ.

Glycerite of Tar.

Tar, *sixty-five grammes*	65 Gm.
Magnesium Carbonate, *one hundred and twenty-five grammes.*	125 Gm.
Glycerin, *two hundred and fifty cubic centimeters*	250 Cc.
Alcohol, *one hundred and twenty-five cubic centimeters*	125 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Upon the Tar, contained in a mortar, pour *two hundred* (200) *cubic centimeters* of cold Water, stir them thoroughly together, and pour off the Water. Repeat this once or twice, until the Water only feebly reddens blue litmus-paper. Now triturate the washed Tar with the Alcohol, gradually incorporate the Magnesium Carbonate and Glycerin, and lastly, *six hundred and twenty-five* (625) *cubic centimeters* of Water. Pour the mixture upon a filter of loose texture spread over a piece of straining muslin, and, after the liquid portion has passed through, wash the residue on the filter with Water, until the whole filtrate measures *one thousand* (1000) *cubic centimeters.*

Note.—Regarding filters of loose texture, see the Note to F. 187.

189. GLYCERITUM TRAGACANTHÆ.

Glycerite of Tragacanth.

Tragacanth, in fine powder, *one hundred and twenty-five grammes*	125 Gm.
Glycerin, *seven hundred and seventy-five cubic centimeters* . . .	775 Cc.
Water, *one hundred and eighty-five cubic centimeters*	185 Cc.

Triturate the Tragacanth with the Glycerin in a mortar, add the Water, and continue the trituration, until a homogeneous, thick paste results.

Note.—The *Glycerinum Tragacanthæ* of the British Pharm. is prepared by mixing 3 troy ounces of Tragacanth with 12 fluidounces of Glycerin in a mortar, adding 2 fluidounces of Water, and triturating until a translucent, homogeneous jelly is formed.

Mucilago Tragacanthæ of the U. S. Pharm. (1890) is made by mixing 18 grammes of Glycerin with 75 cubic centimeters of Water, heating the mixture to boiling, adding 6 grammes of Tragacanth, macerating for twenty-four hours, then adding Water to make 100 grammes, beating it to a uniform consistence, and straining.

Unguentum Glycerini of the German Pharm. is prepared by triturating 1 part of powdered Tragacanth with 5 parts (by weight) of Alcohol (of about 91 %), then adding 50 parts of Glycerin, and heating on a steam-bath.

190. COSSYPIUM STYPTICUM.

Styptic Cotton.

Purified Cotton (U. S. P.),
Solution of Chloride of Iron (U. S. P.),
Glycerin,
Water, of each . . . . . **a sufficient quantity.**

Mix the liquids in the proportion of *five* (5) *parts* of the Iron Solution, *one* (1) *part* of Glycerin, and *four* (4) *parts* of Water, in such quantities that the Purified Cotton shall be completely immersed in the liquid when gently pressed. Allow the Cotton to remain in the liquid one hour, then remove it, press it until it has been brought to *twice* its original weight, spread it out in thin layers, in a warm place, protected from dust and light, and when it is sufficiently dry, transfer it to well-closed receptacles.

191. INFUSUM BRAYERÆ.

(U. S. P., 1880.)

Infusion of Brayera.

Brayera, in No. 20 powder, *sixty grammes*	60 Gm.
Boiling Water, *one thousand cubic centimeters*	1000 Cc.

Pour the Boiling Water upon the Brayera, and let it macerate in a covered vessel until cool.

This infusion should be dispensed without straining.

192. INFUSUM GENTIANÆ COMPOSITUM FORTIUS.

Stronger Compound Infusion of Gentian.

Gentian, *one hundred and twenty-five grammes*	125 Gm.
Coriander, *thirty-five grammes*	35 Gm.
Bitter Orange Peel, *thirty-five grammes*	35 Gm.
Diluted Alcohol (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Reduce the drugs to a moderately coarse (No. 40) powder, moisten it with Diluted Alcohol, pack it in a percolator, and percolate with Diluted Alcohol, until *one thousand* (1000) *cubic centimeters* are obtained.

Note.—When *Infusum Gentianæ Compositum* is prescribed, mix 1 volume of this preparation with 3 volumes of water.

193. INFUSUM ROSÆ COMPOSITUM.

Compound Infusion of Rose.

Red Rose, *thirteen grammes*	13 Gm.
Diluted Sulphuric Acid (U. S. P.), *nine cubic centimeters* . .	9 Cc.
Sugar, *forty grammes*	40 Gm.
Boiling Water, *one thousand cubic centimeters*	1000 Cc.

Pour the Boiling Water upon the Rose in a glass or porcelain vessel, add the Acid, cover the vessel, and macerate for an hour. Then dissolve the Sugar in the liquid and strain.

194. IODOFORMUM AROMATISATUM.

Aromatized Iodoform.

Deodorized Iodoform.

Iodoform, *ninety-six grammes*	96 Gm.
Cumarin, *four grammes*	4 Gm.

Mix them intimately by trituration.

Note.—Should cumarin not be available, or should it be objectionable to the patient, the odor of Iodoform may also be more or less masked by many essential oils, for instance those of peppermint, cloves, cinnamon, citronella, bergamot, sassafras, eucalyptus, etc. Another efficient covering agent is freshly-roasted and powdered coffee.

The odor of Iodoform may be removed from the hands or any utensils which it has come in contact with, by washing them with an aqueous solution of tannic acid.

195. LAC FERMENTATUM.

Fermented Milk.

Kumyss.

Cow's Milk, fresh, *one thousand cubic centimeters*	1000 Cc.
Yeast, semi-liquid, *five cubic centimeters*	5 Cc.
Sugar, *thirty-five grammes*	35 Gm.

Dissolve the Sugar in the Milk, contained in a strong bottle, add the yeast, cork the bottle securely, and keep it at a temperature between 23° and 32° C. (73.4° to 89.6° F.), for six hours; then transfer it to a cold place.

Note.—In place of preparing Kumyss with sweet milk, and waiting until it turns sour, the casein may be precipitated at once by the addition of one-third of ready Kumyss to fresh milk. Yeast is not necessary, but Sugar must be added to produce enough Carbonic Acid Gas to cause effervescence.

Kumyss may also be made from sour milk, freed from its crusts of cream, by breaking up the curd by vigorous stirring, and causing alcoholic fermentation by addition of Sugar and Yeast. The cream removed may be replaced by sweet cream.

Kephir-Kumyss is prepared by adding active Kephir grains to fresh milk, kept at a temperature of 70° to 80° F., until the effect of fermentation becomes apparent by the rising of the grains to the surface. The grains may then be strained off, and the milk, which now contains enough Yeast-cells to insure continuance of the fermentation, left to itself in well-corked bottles.

196. LINIMENTUM ACONITI ET CHLOROFORMI.

Liniment of Aconite and Chloroform.

Tincture of Aconite (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Chloroform, *one hundred and twenty-five cubic centimeters*	125 Cc.
Soap Liniment (U. S. P.), *seven hundred and fifty cubic centimeters*	750 Cc.

Mix them.

197. LINIMENTUM AMMONII IODIDI.

Liniment of Ammonium Iodide.

Iodine, *four grammes*	4 Gm.
Oil of Rosemary, *fifteen cubic centimeters*	15 Cc.
Oil of Lavender, *fifteen cubic centimeters*	15 Cc.
Camphor, *thirty grammes*	30 Gm.
Water of Ammonia (U. S. P.), *one hundred and ten cubic centimeters*	110 Cc.
Alcohol, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Iodine, the Oils and the Camphor, in *seven hundred and fifty* (750) *cubic centimeters* of Alcohol, then add the Water of Ammonia, and lastly, enough Alcohol to make *one thousand* (1000) *cubic centimeters.*

Note.—On standing, the liquid will become colorless, and there will, usually, be a slight precipitate, which may be separated by filtration.

198. LINIMENTUM CANTHARIDIS.

(U. S. P., 1880.)

Cantharides Liniment.

Cantharides, in No. 60 powder, *one hundred and fifty grammes.*	150 Gm.
Oil of Turpentine, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Digest the Cantharides with *one thousand* (1000) *cubic centimeters* of Oil of Turpentine, in a closed vessel, by means of a water-bath, for three hours; then strain, and add enough Oil of Turpentine through the strainer to make the liniment measure *one thousand* (1000) *cubic centimeters.*

199. LINIMENTUM IODI.

Iodine Liniment.

Iodine, *one hundred and twenty-five grammes*	125 Gm.
Potassium Iodide, *fifty grammes*	50 Gm.
Glycerin, *thirty-five cubic centimeters*	35 Cc.
Water, *sixty-five cubic centimeters*	65 Cc.
Alcohol, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix *eight hundred* (800) *cubic centimeters* of Alcohol with the other ingredients, and dissolve the solids by agitation. Then add enough Alcohol to make *one thousand* (1000) *cubic centimeters.*

Note.—The proportion of the ingredients above given yields a product practically identical with that prescribed by the *British Pharmacopœia.*

200. LINIMENTUM OPII COMPOSITUM.

Compound Liniment of Opium.

Canada Liniment.

Tincture of Opium (U. S. P.), *one hundred cubic centimeters*	100	Cc.
Camphor, *seventeen and one-half grammes*	17.5	Gm.
Alcohol, *two hundred and fifty cubic centimeters*	250	Cc.
Oil of Peppermint, *twenty-five cubic centimeters*	25	Cc.
Water of Ammonia (U. S. P.), *three hundred and seventy-five cubic centimeters*	375	Cc.
Oil of Turpentine, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Camphor and the Oil of Peppermint in the Alcohol, then add the Tincture of Opium, Water of Ammonia and enough Oil of Turpentine to make *one thousand* (1000) *cubic centimeters*. Shake the mixture, whenever any of it is to be dispensed.

Note.—This Liniment will separate a short time after it has been mixed. It may be made somewhat more permanent by adding *twenty-five* (25) *cubic centimeters* of Tincture of Quillaja (U. S. P.), to the Water of Ammonia, before adding it to the mixture.

201. LINIMENTUM PLUMBI SUBACETATIS.

(U. S. P., 1880.)

Liniment of Lead Subacetate.

Solution of Lead Subacetate (U. S. P.), *three hundred and fifty cubic centimeters*	350	Cc.
Cotton Seed Oil, *six hundred and fifty cubic centimeters*	650	Cc.

Mix them.

202. LINIMENTUM SAPONATO-CAMPHORATUM.

Camphorated Soap Liniment.

Opodeldoc. Solid Opodeldoc.

White Castile Soap, dried and powdered, *seventy-five grammes.*	75	Gm.
Camphor, *twenty-five grammes*	25	Gm.
Alcohol, *nine hundred and fifty cubic centimeters*	950	Cc.
Oil of Thyme, *three cubic centimeters*	3	Cc.
Oil of Rosemary, *six cubic centimeters*	6	Cc.
Stronger Water of Ammonia (U. S. P.), *fifty cubic centimeters.*	50	Cc.

Introduce the Castile Soap, Camphor, and Alcohol, into a flask or suitable bottle, and apply a gentle heat until solution is effected, taking care that no loss of Alcohol be incurred by evaporation. Filter the liquid, while hot, into another flask or bottle; warm again, if necessary, to render the contents liquid, add the Oils and Stronger Water of Ammonia, and when the whole has been thoroughly mixed, pour it into small dry vials, which should have been previously warmed, and should immediately be corked and cooled.

Note.—The quantity above given is usually divided into 18 to 20 vials. Solid Opodeldoc is directed by the *German Pharm.* to be prepared with soap made from animal fats; but pure, white Castile Soap may be used, provided it has been previously deprived of water. The Stronger Water of Ammonia should be of the full strength prescribed by the *U. S. Pharm.*

203. LINIMENTUM TEREBINTHINÆ ACETICUM.

Acetic Turpentine Liniment.

Linimentum Album. Stokes' Liniment. St. John Long's Liniment.

Oil of Turpentine, *one hundred cubic centimeters*	100 Cc.
Fresh Egg, albumen and yolk, *one*	(1)
Oil of Lemon, *four cubic centimeters*	4 Cc.
Acetic Acid (U. S. P.), *twenty cubic centimeters*	20 Cc.
Rose Water (U. S. P.), *eighty-five cubic centimeters*	85 Cc.

Triturate or beat the contents of the Fresh Egg with the Oil of Turpentine and the Oil of Lemon in a mortar until they are thoroughly mixed. Then incorporate the Acetic Acid and Rose Water. Shake the mixture, whenever any of it is to be dispensed.

204. LINIMENTUM TIGLII.

Liniment of Croton Oil.

Linimentum Crotonis (Brit. Ph.).

Croton Oil, *twelve cubic centimeters*	12 Cc.
Oil of Cajuput, *forty-four cubic centimeters*	44 Cc.
Alcohol, *forty-four cubic centimeters*	44 Cc.

Mix them.

205. LINIMENTUM TIGLII COMPOSITUM.

Compound Croton Oil Liniment.

Croton Oil, *twenty cubic centimeters*	20 Cc.
Oil of Sassafras, *twenty cubic centimeters*	20 Cc.
Oil of Turpentine, *twenty cubic centimeters*	20 Cc.
Oil of Olive, *forty cubic centimeters*	40 Cc.

Mix them.

206. LIQUOR ACIDI PHOSPHORICI COMPOSITUS.

Compound Solution of Phosphoric Acid.

Solution of Acid Phosphates.

Bone Ash, in fine powder, *one thousand grammes*	1000 Gm.
Sulphuric Acid (sp. gr., 1.830), *seven hundred and eighty grammes*	780 Gm.
Water, *four thousand cubic centimeters*	4000 Cc.

Mix the Bone Ash with *one thousand* (1000) *cubic centimeters* of Water, add the Sulphuric Acid, diluted with *two thousand* (2000) *cubic centimeters* of Water, and mix thoroughly with a porcelain or glass stirrer. Now add the remainder of the Water and set the mixture aside for twenty-four hours, stirring occasionally. Then transfer the

mixture to a strong muslin strainer, and subject this to a gradual pressure (avoiding contact with metals), so as to express as much of the liquid as possible. Lastly, filter this through paper.

The specific gravity of this solution is about 1.113 at 15° C. (59° F.).

Note.—The quantity of product obtained depends on the degree of force used in pressing. By strong pressure, about 3500 parts may be obtained. If desired, the magma may also be poured in a glass percolator, the neck of which contains a layer of fine quartz sand or asbestos, previously deprived of matters soluble in sulphuric or phosphoric acids. On cautiously pouring water on top, so as not to mix it with the magma, the acid solution will be displaced. But the percolation must be interrupted as soon as the specific gravity of the percolate begins to fall below 1.113. The Sulphuric Acid used in this preparation may be the commercial variety, provided it is free from arsenic, and of a specific gravity not less than 1.830.

207. LIQUOR ALUMINI ACETATIS.

Solution of Aluminum Acetate.

Aluminum Sulphate, crystallized, *three hundred grammes* . .	300 Gm.
Acetic Acid (U. S. P.), *three hundred grammes*	300 Gm.
Calcium Carbonate, *one hundred and thirty grammes*	130 Gm.
Water, *one thousand cubic centimeters*	1000 Cc.

Dissolve the Calcium Carbonate in the Acetic Acid mixed with *two hundred* (200) *cubic centimeters* of Water, and the Aluminum Sulphate in *eight hundred* (800) *cubic centimeters*. Mix the two solutions, and allow the mixture to stand for twenty-four hours, agitating occasionally. Then pour off the clear solution and filter.

The Solution contains from 7.5 to 8 per cent. of basic Aluminum Acetate.

Note.—Practically identical with the *Liquor Aluminii Acetici* of the German Pharm.

208. LIQUOR ALUMINI ACETICO-TARTRATIS.

Solution of Aluminum Acetico-Tartrate.

Alum (U. S. P.), *seven hundred and fifty grammes*	750 Gm.
Sodium Carbonate, *seven hundred grammes*	700 Gm.
Glacial Acetic Acid (U. S. P.), *one hundred and fifty grammes*.	150 Gm.
Tartaric Acid, *one hundred and thirty-five grammes*	135 Gm.
Water, a sufficient quantity.	
To make one thousand grammes.	1000 Gm.

Dissolve the Alum and the Sodium Carbonate each in *ten thousand* (10,000) *cubic centimeters* of Water, mix the solutions, and wash the precipitate with water, first by decantation, and afterwards on a strainer, until the washings run off tasteless. Allow the precipitate to drain and to shrink in volume by exposure on the strainer. Then transfer it to a tared capsule, add the Glacial Acetic and the Tartaric Acids, and apply heat until solution has been effected. Finally, evaporate the liquid to *one thousand* (1000) *grammes*.

The product contains about 50 per cent. of dry, so-called Aluminum Acetico-Tartrate.

Note.—The dry salt may be obtained by evaporating the solution.

209. LIQUOR AMMONII ACETATIS CONCENTRATUS.

Concentrated Solution of Ammonium Acetate.

Acetic Acid (U. S. P.), *five hundred cubic centimeters*	500 Cc.
Ammonium Carbonate,	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Neutralize the Acetic Acid with a sufficient quantity of Ammonium Carbonate, carefully avoiding an excess. Then add enough Water to make the product measure *one thousand* (1000) *cubic centimeters.*

Note.—The product is of about 3 times the strength of the official *Liquor Ammonii Acetatis.*

Note.—It is not recommended to keep this solution on hand for the preparation of the official *Liquor Ammonii Acetatis*, as this is preferably made freshly when wanted for use. When it is, however, required, or deemed of advantage, to dispense the concentrated solution, it is suggested that it be diluted with Carbonic Acid Water, or be directed to be diluted with this at the time of administration.

210. LIQUOR AMMONII CITRATIS FORTIOR.

Stronger Solution of Ammonium Citrate.

Citric Acid, *five hundred and sixty grammes*	560 Gm.
Stronger Water of Ammonia (U. S. P.),	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Neutralize the Citric Acid with the Stronger Water of Ammonia, and add enough Water to make *one thousand* (1000) *cubic centimeters.* The solution should be kept in bottles free from lead.

Each fluidrachm contains about 40 grains of Ammonium Citrate.

Note.—This Solution is apt to take up notable quantities of lead, if kept in bottles made of flint glass.

Liquor Ammonii Citratis (Brit. Pharm.) may be prepared from this solution by mixing 1 volume of it with 4 volumes of Water.

211. LIQUOR AURI ET ARSENII BROMIDI.

Solution of Bromide of Gold and Arsenic.

Arsenous Acid, *two and one-half grammes*	2.5 Gm.
Tribromide of Gold, *three and one-fourth grammes*	3.25 Gm.
Bromine Water,	
Distilled Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Introduce the Arsenous Acid and about *one hundred and thirty-five* (135) *cubic centimeters* of Bromine Water into a flask and heat gently until all free Bromine has disappeared. Then add Bromine Water, *twenty* (20) to *thirty* (30) *drops* at a time, until it will be present in slight excess, or until the solution does not become colorless after some

time. Transfer the solution to a porcelain capsule, expel the excess of Bromine with the aid of gentle heat, dilute it with Water to about *nine hundred* (900) *cubic centimeters*, and dissolve in this the Tribromide of Gold, adding enough Water to make *one thousand* (1000) *cubic centimeters*.

Ten (10) minims of this solution contains $\frac{1}{32}$ grain of Tribromide of Gold and the equivalent of $\frac{1}{10}$ grain of Tribromide of Arsenic.

Note.—Bromine Water is made by shaking Bromine with about thirty times its weight of Water, occasionally during several hours, and decanting the Water from the undissolved Bromine.

212. LIQUOR BISMUTHI.

Solution of Bismuth.

Liquid Bismuth.

Glycerite of Bismuth (F. 185), *one hundred and twenty-five cubic centimeters*	125 Cc.
Alcohol, *one hundred and twenty-five cubic centimeters*	125 Cc.
Distilled Water, *seven hundred and fifty cubic centimeters*	750 Cc.

Mix the Glycerite of Bismuth with the Distilled Water then add the Alcohol.

Solution of Bismuth may also be prepared in the following manner:

Bismuth and Ammonium Citrate, *seventeen and one-half grammes*	17.5 Gm.
Alcohol, *one hundred and twenty-five cubic centimeters*	125 Cc.
Glycerin, *sixty-five cubic centimeters*	65 Cc.
Water of Ammonia (U. S. P.), **Distilled Water**, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Bismuth and Ammonium Citrate in *seven hundred and fifty* (750) *cubic centimeters* of Distilled Water, and allow the solution to stand a short time. Should any insoluble matter have deposited, pour off the clear liquid and add just enough Water of Ammonia to the residue to dissolve it, or to cause it to retain a faint odor of Ammonia. Then filter the united liquids, add the Alcohol, the Glycerin, and enough Distilled Water to make *one thousand* (1000) *cubic centimeters*.

This preparation should be freshly made when wanted for use.

Each fluidrachm represents 1 grain of Bismuth and Ammonium Citrate.

213. LIQUOR BROMI.

Solution of Bromine.

Smith's Solution of Bromine.

Bromine, *twenty-five grammes*	25 Gm.
Potassium Bromide, *twelve and one-half grammes*	12.5 Gm.
Water, *one hundred cubic centimeters*	100 Cc.

Dissolve the Potassium Bromide in the Water contained in a bottle, add the Bromine, and shake the mixture until this is dissolved. Keep the solution in glass-stoppered vials in a dark place.

Note.—As bromine vapor is very injurious to the respiratory passages and destructive to balances, it is often preferable to take the contents of an original bottle of Bromine—weighing the bottle, both before opening it and after emptying it, in order to ascertain the exact weight of the Bromine contained therein—and then to use a quantity of Potassium Bromide and of Water proportionate to the quantities above given.

214. LIQUOR CALCIS SULPHURATÆ.

Solution of Sulphurated Lime.

Solution of Oxysulphuret of Calcium. Vleminck's Solution (or *Lotion*).

Lime, freshly slaked, *one hundred and sixty-five grammes* . . .	165 Gm.
Sublimed Sulphur, *two hundred and fifty grammes*	250 Gm.
Water, a sufficient quantity	
To make one thousand grammes	1000 Gm.

Mix the slaked Lime with the Sulphur, and add the mixture gradually to *sixteen hundred and fifty* (1650) *grammes* of boiling Water. Then boil the whole, under constant stirring, until it is reduced to *one thousand* (1000) *grammes*, strain, and having allowed the solution to become clear by standing in a well-stoppered bottle, decant the clear brown liquid, and keep it in completely filled and well-stoppered bottles.

215. LIQUOR CARMINI.

Solution of Carmine.

Carmine, *sixty grammes*	60 Gm.
Water of Ammonia (U. S. P.), *three hundred and fifty cubic centimeters*	350 Cc.
Glycerin, *three hundred and fifty cubic centimeters*	350 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Carmine to a fine powder in a wedgewood mortar, gradually add the Water of Ammonia, and afterwards the Glycerin, under constant trituration. Transfer the mixture to a porcelain capsule, and heat it upon a water-bath, constantly stirring, until the liquid is entirely free from ammoniacal odor. Then cool, and add enough Water to make *one thousand* (1000) *cubic centimeters.*

Note.—The best quality of Carmine, known in commerce as "No. 40," should be used for this preparation.

216. LIQUOR COCCINEUS.

Cochineal Color.

Cochineal, in No. 50 powder, *sixty grammes*	60 Gm.
Potassium Carbonate, *thirty grammes*	30 Gm.
Alum, *thirty grammes*	30 Gm.
Potassium Bitartrate, *sixty grammes*	60 Gm.
Glycerin, *five hundred cubic centimeters*	500 Cc.
Alcohol, *thirty cubic centimeters*	30 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Cochineal intimately with the Potassium Carbonate and *five hundred* (500) *cubic centimeters* of Water. Then add the Alum and Potassium Bitartrate successively, heat the mixture to boiling in a capacious vessel, then set it aside to cool, add to it the Glycerin and Alcohol, filter, and pass enough Water through the filter to make *one thousand* (1000) *cubic centimeters.*

217. LIQUOR ELECTROPOEICUS.

Battery Fluid.

A. For the Carbon and Zinc Battery.

I. For ordinary use.

Sodium Bichromate, in coarse powder, *one hundred and twenty-five grammes*	125 Gm.
Sulphuric Acid, commercial, *one hundred and twenty-five cubic centimeters*	125 Cc.
Water, cold, *one thousand cubic centimeters*	1000 Cc.

Pour the Sulphuric Acid upon the powdered Bichromate, and stir the mixture occasionally during one hour. Then slowly add the Water.

II. For use with the Galvano-Cautery.

Sodium Bichromate, in coarse powder, *one hundred and forty grammes*	140 Gm.
Sulphuric Acid, commercial, *three hundred cubic centimeters*	300 Cc.
Water, cold, *one thousand cubic centimeters*	1000 Cc.

Proceed in the same manner as directed under No. I.

Note.—Sodium Bichromate is more soluble than the potassium salt, and its products of decomposition, in the battery, are also more soluble. As it is also much cheaper, it is now preferred in all large electric laboratories. When it cannot be obtained, Potassium Bichromate may be used in place of it, as heretofore. The two salts may be substituted for each other, weight for weight.

B. For the Leclanché Battery.

Ammonium Chloride, *three hundred and twenty-five grammes.*	325 Gm.
Water, enough to make *one thousand cubic centimeters*	1000 Cc.

Dissolve the salt in the Water.

218. LIQUOR EXTRACTI GLYCYRRHIZÆ.

Solution of Extract of Glycyrrhiza.

Solution of Extract of Liquorice.

Purified Extract of Glycyrrhiza (F. 158) . . .	a sufficient quantity.
Alcohol, *one hundred and twenty-five cubic centimeters*	125 Cc.
Glycerin, *two hundred and fifty cubic centimeters*	250 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

In a small portion of Purified Extract of Glycyrrhiza, weighed into a tared capsule, determine the amount of water, by drying it to a constant weight. Then take of the Purified Extract a quantity equivalent to *two hundred and fifty* (250) *grammes* of dry extract, dissolve this, on a water-bath, in *two hundred and fifty* (250) *cubic centimeters* of Water, add the Glycerin, and allow the liquid to cool. Lastly, add the Alcohol, and enough Water to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents 15 grains of dry Extract of Glycyrrhiza.

219. LIQUOR FERRI HYPOPHOSPHITIS.

Solution of Hypophosphite of Iron.

Solution of Ferric Hypophosphite.

Iron and Ammonium Sulphate (U. S. P.), in perfect crystals, *three hundred and thirty grammes*	330 Gm.
Sodium Hypophosphite, *two hundred and twenty grammes* . .	220 Gm.
Potassium Citrate, *two hundred and fifteen grammes*	215 Gm.
Glycerin, *one hundred and fifty cubic centimeters*	150 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Iron and Ammonium Sulphate, and the Sodium Hypophosphite, each, in *fifteen hundred* (1500) *cubic centimeters* of Water, and, if necessary, filter each solution. Then mix them, and stir thoroughly; after a few minutes transfer the resulting magma to a close linen or muslin strainer, and wash the precipitate with about *five hundred* (500) *cubic centimeters* of Water. Allow it to drain, and then press it forcibly in the strainer, so as to remove as much of the liquid as possible. Transfer the precipitate from the strainer to a mortar, add to it the Potassium Citrate, and triturate until a perfectly smooth paste results. Then add the Glycerin, and gradually, while stirring, enough Water to make the solution measure *one thousand* (1000) *cubic centimeters.* Place it for several days in a cold place, if convenient; then pour off the clear solution from any precipitate or crystals that may have formed, and keep the solution in small, completely-filled and well-corked bottles.

Solution of Hypophosphite of Iron (ferric) may also be prepared in the following manner:

Hypophosphite of Iron (F. 183), *one hundred and sixty-five grammes*	165 Gm.
Potassium Citrate, *two hundred and fifteen grammes*	215 Gm.
Glycerin, *one hundred and fifty cubic centimeters*	150 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Hypophosphite of Iron with *three hundred and fifty* (350) *cubic centimeters* of Water to a perfectly smooth mixture, then add the Potassium Citrate and Glycerin, and apply a gentle heat, until solution has been effected. Allow the liquid to cool, and add enough Water to make *one thousand* (1000) *cubic centimeters*. Place the solution for several days in a cold place, if convenient; then pour off the clear solution from any precipitate or crystals that may have formed, and keep the solution in small, completely-filled and well-corked bottles.

About 6 minims of this Solution represent 1 grain of Hypophosphite of Iron (*ferric*).

220. LIQUOR FERRI IODIDI.

Solution of Iodide of Iron.

Iron, in the form of fine, bright, and finely-cut wire, *two hundred grammes*	200 Gm.
Iodine, *six hundred and sixty-four grammes*	664 Gm.
Diluted Hypophosphorous Acid (U. S. P.), *twenty-five cubic centimeters*	25 Cc.
Distilled Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Iron with *seven hundred and fifty* (750) *cubic centimeters* of Distilled Water in a flask, add about one-half of the Iodine, and agitate continuously until the liquid becomes hot. Then moderate the reaction by placing the flask in cold water, or by allowing cold water to flow over it, meanwhile keeping up the agitation. When the reaction has moderated, add one-half of the remaining Iodine at a time, and carefully moderate the reaction each time, in the manner above directed. Finally, raise the contents of the flask to boiling and filter immediately through moistened pure filtering paper (the point of the filter being supported by a pellet of absorbent cotton) into a bottle containing the Diluted Hypophosphorous Acid. When all the liquid has passed, rinse the flask with *thirty-five* (35) *cubic centimeters* of boiling Distilled Water, and pass this through the filter. Cork the bottle and set it aside to cool. Finally, add enough Distilled Water to make the product measure *one thousand* (1000) *cubic centimeters*.

Note.—This solution contains about 85 per cent. of Iodide of Iron (ferrous). On mixing 1 volume with 7 volumes of Syrup (U. S. P.), the product will be practically identical with Syrup of Iodide of Iron (U. S. P.).

221. LIQUOR FERRI OXYSULPHATIS.

Solution of Oxysulphate of Iron.

Sulphate of Iron, *one hundred and sixty-five grammes*	165 Gm.
Nitric Acid (U. S. P.), *one hundred and sixty-five grammes* . .	165 Gm.
Distilled Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Sulphate of Iron in *eight hundred and fifty* (850) *cubic centimeters* of boiling Distilled Water, in a flask, gradually add the Nitric Acid, and continue the heat until the escaping vapors cease to have a nitrous odor. When the reaction is completed, allow the liquid to cool and add enough Distilled Water to make *one thousand* (1000) *cubic centimeters.*

222. LIQUOR FERRI PROTOCHLORIDI.

Solution of Protochloride of Iron.

Solution of Ferrous Chloride.

Iron, in the form of fine, bright, and finely-cut wire, *one hundred and sixty grammes*	160 Gm.
Hydrochloric Acid (U. S. P.), *six hundred and twenty-five grammes*	625 Gm.
Glycerin, *two hundred and fifty cubic centimeters*	250 Cc.
Diluted Hypophosphorous Acid (U. S. P.), *ten cubic centimeters*	10 Cc.
Distilled Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

To the Iron, contained in a flask, add *three hundred and fifty* (350) *cubic centimeters* of Distilled Water, and the Hydrochloric Acid, and apply a gentle heat, until effervescence ceases. Then raise the liquid to boiling, keep it at this temperature for a short time so that the Iron may be brought into solution as far as possible, filter the solution through a pellet of absorbent cotton placed in the neck of a funnel, and wash the cotton with a little Distilled Water. Evaporate the filtrate, over a boiling water-bath, until crystals begin to form, and the escaping vapors cease to redden, or only slightly affect, moistened blue litmus paper. Now add the Glycerin and the Diluted Hypophosphorous Acid, continue the heat, if necessary, until a perfect solution is obtained: then transfer the liquid to a graduated bottle, allow it to cool, and add enough Distilled Water to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents about 20 grains of Protochloride of Iron (ferrous chloride).

223. LIQUOR GUTTA-PERCHÆ.

(U. S. P., 1880).

Solution of Gutta-Percha.

Gutta-Percha, in thin slices, *fifteen grammes*	15 Gm.
Commercial Chloroform, *one hundred cubic centimeters* . . .	100 Cc.
Lead Carbonate, in fine powder, *seventeen grammes*	17 Gm.

Add the Gutta-Percha to *seventy-five* (75) *cubic centimeters* of the Chloroform, contained in a bottle, cork it well, and shake it occasionally until the Gutta-Percha is dissolved. Then add the Lead Carbonate, previously mixed with the remainder of the Chloroform, and, having several times shaken the whole together, at intervals of half an hour, set the mixture aside until the insoluble matters have subsided and the solution has become perfectly clear. Lastly, decant the liquid and preserve it in small, cork-stoppered vials.

224. LIQUOR HYDRARGYRI ET POTASSII IODIDI.

Solution of Iodide of Mercury and Potassium.

Solution of Potassium Iodohydrargyrate. Channing's Solution.

Red Iodide of Mercury, *ten grammes*	10 Gm.
Potassium Iodide, *eight grammes*	8 Gm.
Distilled Water, *one thousand cubic centimeters*	1000 Cc.

Dissolve the salts in the Distilled Water.

225. LIQUOR HYPOPHOSPHITUM.

Solution of Hypophosphites.

Calcium Hypophosphite, *thirty-five grammes*	35 Gm.
Sodium Hypophosphite, *twenty grammes*	20 Gm.
Potassium Hypophosphite, *seventeen and one-half grammes* .	17.5 Gm.
Citric Acid, *sixteen grammes*	16 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the salts and the Citric Acid in Water so as to make *one thousand* (1000) *cubic centimeters;* filter, if necessary, and pass enough Water through the filter to restore the original volume.

Each fluidrachm contains 2 grains of Calcium Hypophosphite, 1¼ grain of Sodium Hypophosphite, and 1 grain of Potassium Hypophosphite.

226. LIQUOR IODI CARBOLATUS.

Carbolized Solution of Iodine.

Boulton's Solution. French Mixture.

Compound Tincture of Iodine (U. S. P.), *fifteen cubic centimeters*	15 Cc.
Carbolic Acid, liquefied by a gentle heat, *five and one-half cubic centimeters*	5.5 Cc.
Glycerin, *one hundred and sixty-five cubic centimeters*	165 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc

Mix the Glycerin with the Carbolic Acid and Compound Tincture of Iodine, add enough Water to make *one thousand* (1000) *cubic centimeters*, and expose the mixture to sunlight until it has become colorless.

227. LIQUOR IODI CAUSTICUS.

Caustic Solution of Iodine.

Iodine Caustic. Churchill's Iodine Caustic.

Iodine, *twenty-five grammes*	25 Gm.
Potassium Iodide, *fifty grammes*	50 Gm.
Water, *one hundred cubic centimeters*	100 Cc.

Dissolve the Potassium Iodide and the Iodine in the Water.

228. LIQUOR MAGNESII BROMIDI.

Solution of Magnesium Bromide.

Diluted Hydrobromic Acid (U. S. P.), *one thousand cubic centimeters*	1000 Cc.
Magnesium Carbonate	a sufficient quantity.

Saturate the Diluted Hydrobromic Acid with a sufficient quantity (about *sixty-five* (65) *grammes*) of Magnesium Carbonate. When effervescence has ceased, filter.

Each fluidrachm contains about 7 grains of Magnesium Bromide.

229. LIQUOR MAGNESII SULPHATIS EFFERVESCENS.

Liquor Magnesiæ Effervescens.

Effervescent Solution of Magnesium Sulphate.

Magnesium Sulphate, *twenty-five grammes*	25	Gm.
Citric Acid, *four grammes*	4	Gm.
Syrup of Citric Acid (U. S. P.), *sixty cubic centimeters*	60	Cc.
Potassium Bicarbonate, crystals, *two and one-half grammes*	2.5	Gm.
Water, a sufficient quantity		
To make three hundred and fifty cubic centimeters	350	Cc.

Dissolve the Magnesium Sulphate and the Citric Acid in *two hundred and fifty* (250) *cubic centimeters* of Water, add the Syrup of Citric Acid, and filter the solution into a strong bottle of about *three hundred and sixty* (360) *cubic centimeters* capacity. Then add enough Water to nearly fill the bottle, drop in the crystals of Potassium Bicarbonate, immediately close the bottle with a cork, and secure it with twine. Lastly, shake the bottle occasionally, until the crystals are dissolved.

230. LIQUOR MORPHINÆ CITRATIS.

Solution of Morphine Citrate.

Morphine (alkaloid), *three and one-half grammes*	3.5 Gm.
Citric Acid, *three grammes*	3 Gm.
Cochineal, *one-tenth of a gramme*	0.1 Gm.
Alcohol, *twelve and one-half cubic centimeters*	12.5 Cc.
Distilled Water, a sufficient quantity	
To make one hundred cubic centimeters	100 Cc.

Triturate the solids with the Alcohol and *eighty* (80) *cubic centimeters* of Water; filter and pass enough Distilled Water through the filter to make *one hundred* (100) *cubic centimeters*.

This Solution should not be kept on hand, but prepared only when required.

Each fluidrachm contains 2 grains of Morphine in the form of Citrate.

231. LIQUOR MORPHINÆ HYPODERMICUS.

Hypodermic Solution of Morphine.

Magendie's Solution of Morphine.

Morphine Sulphate, *three and one-half grammes*	3.5 Gm.
Distilled Water, warm, *one hundred cubic centimeters*	100 Cc.

Dissolve the Morphine Sulphate in the warm Distilled Water, and filter the solution through a small pellet of absorbent cotton. When the solution is cold, pass a little Distilled Water through the cotton, if necessary, to make the filtrate measure *one hundred* (100) *cubic centimeters*. Keep the solution in well-stoppered vials, in a dark place.

Note.—Particular care should be taken in dispensing and labelling this solution, so that it may not be mistaken for the so called United States Solution of Morphine (*Liquor Morphiæ Sulphatis*, U. S. P., 1870), containing only 1 grain of Morphine Sulphate in each fluidounce, which is still used in some parts of this country.

The development of fungoid growths or micro-organisms in this and similar solutions used hypodermically may be prevented, or at least greatly retarded, by using Chloroform Water instead of plain Distilled Water as a solvent. This should, however, be done only with the knowledge, or by the direction, of the physician.

Another efficient method to preserve such solutions is, to sprinkle a little Benzoic Acid on the surface of the absorbent cotton through which the solutions are filtered. Or, about 5 grains of Boric Acid may be added to each fluidounce.

232. LIQUOR PANCREATICUS.

Pancreatic Solution.

Pancreatin (U. S. P.), *seventeen and one-half grammes*	17.5 Gm.
Sodium Bicarbonate, *fifty grammes*	50 Gm.
Glycerin, *two hundred and fifty cubic centimeters*	250 Cc.
Compound Spirit of Cardamom (F. 347), *thirty-five cubic centimeters*	35 Cc.
Alcohol, *thirty-five cubic centimeters*	35 Cc.
Purified Talcum (F. 395), *fifteen grammes*	15 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Pancreatin and the Sodium Bicarbonate gradually with *six hundred and fifty* (650) *cubic centimeters* of the Water; add the Alcohol, Compound Spirit of Cardamom and Purified Talcum; mix them thoroughly by shaking, and pour the mixture upon a wetted filter, returning the first portions of the filtrate, until it runs off clear. Wash the filter with enough Water to obtain *seven hundred and fifty* (750) *cubic centimeters* of filtrate. To this add the Glycerin.

Each fluidrachm represents 1 grain of Pancreatin (*U. S. P.*).

233. LIQUOR PEPSINI.

(U. S. P., 1880.)

Solution of Pepsin.

Saccharated Pepsin (U. S. P.), *forty grammes*	40 Gm.
Hydrochloric Acid (U. S. P.), *twelve grammes*	12 Gm.
Glycerin, *three hundred and twenty-five cubic centimeters*	325 Cc.
Water, *six hundred and fifty cubic centimeters*	650 Cc.

Dissolve the Saccharated Pepsin in the Water, previously mixed with the Hydrochloric Acid, add the Glycerin, let the mixture stand twenty-four hours, and filter.

234. LIQUOR PEPSINI AROMATICUS.

Aromatic Solution of Pepsin.

Pepsin (U. S. P.), *seventeen and one-half grammes*	17.5 Gm.
Oil of Cinnamon, *four drops*	4 Drops.
Oil of Pimenta, *four drops*	4 Drops.
Oil of Cloves, *eight drops*	8 Drops.
Purified Talcum (F. 395), *fifteen grammes*	15 Gm.
Alcohol, *thirty-five cubic centimeters*	35 Cc.
Hydrochloric Acid (U. S. P.), *ten cubic centimeters*	10 Cc.
Glycerin, *two hundred and fifty cubic centimeters*	250 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Pepsin with *five hundred* (500) *cubic centimeters* of Water and the Hydrochloric Acid, and shake the mixture frequently until the Pepsin is dissolved. Then add the Purified Talcum and the Oils, previously dissolved in the Alcohol; mix the whole thoroughly, by agitation, and filter it through a wetted filter, returning the first portions of the liquid until it runs through clear. Pass enough Water through the filter to make the filtrate measure *seven hundred and fifty* (750) *cubic centimeters*. To this add the Glycerin.

Each fluidrachm represents 1 grain of Pepsin (*U. S. P.*).

235. LIQUOR PHOSPHORI.

Solution of Phosphorus.

Thompson's Solution of Phosphorus.

Phosphorus, *seven centigrammes*	0.07 Gm.
Absolute Alcohol, *thirty-five cubic centimeters*	35 Cc.
Spirit of Peppermint (U. S. P.), *one-half cubic centimeter*	0.5 Cc.
Glycerin, *sixty-four and one-half cubic centimeters*	64.5 Cc.

Dissolve the Phosphorus in *thirty* (30) *cubic centimeters* of Absolute Alcohol, in a stoppered vial or test-tube, by immersion in a water-bath and frequent agitation, taking care that any loss of Alcohol, by evaporation, be made up from time to time. Allow the solution to become nearly cold, and then add to it the remainder of the Absolute Alcohol and the Glycerin, previously mixed and slightly warmed. Finally add the Spirit of Peppermint. Keep the Solution in a well-stoppered bottle, in the dark.

Each fluidrachm contains about $\frac{1}{24}$ *grain of Phosphorus.*

Note.—This Solution must not be confounded with the Spiritus Phosphori (U. S. P.), which is not intended to be administered as such, but is only to be used in compounding the Elixir or other preparations of phosphorus.

The Phosphorus should be perfectly translucent, cut and weighed under water, and quickly dried with filtering paper before being dropped into the alcohol.

236. LIQUOR PICIS ALKALINUS.

Alkaline Solution of Tar.

Tar, *two hundred and fifty grammes*	250 Gm.
Potassa, *one hundred and twenty-five grammes*	125 Gm.
Water, *six hundred and twenty-five cubic centimeters*	625 Cc.

Dissolve the Potassa in the Water. Shake the solution with the Tar so that the latter may be dissolved, and strain the solution through muslin.

237. LIQUOR POTASSÆ CHLORATÆ.

Solution of Chlorinated Potassa.

Liquor Potassæ Chlorinatæ. Javelle Water.

Potassium Carbonate, *fifty-eight grammes*	58 Gm.
Chlorinated Lime (U. S. P.), *eighty grammes*	80 Gm.
Water, a sufficient quantity	
To make one thousand grammes	1000 Gm.

Mix the Chlorinated Lime, contained in a tared flask, with *four hundred* (400) *grammes* of Water. Dissolve the Potassium Carbonate in *three hundred* (300) *grammes* of boiling Water, and pour the hot solution into the mixture first prepared. Shake the flask well, stopper it, set it aside to cool, and then add enough Water to make the contents weigh *one thousand* (1000) *grammes.* Allow the suspended mat-

ters to subside, and remove the clear solution by means of a siphon, or by straining through muslin. Keep the product in well-stoppered bottles.

Note.—The Chlorinated Lime should not contain less than 25 per cent. of available chlorine.

238. LIQUOR POTASSII ARSENATIS ET BROMIDI.

Solution of Potassium Arsenate and Bromide.

Liquor Arsenii Bromidi. Solution of Bromide of Arsenic. Clemens' Solution.

Arsenous Acid, *ten grammes*	10 Gm.
Potassium Bicarbonate, *ten grammes*	10 Gm.
Bromine, *fifteen and one-half grammes*	15.5 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Boil the Arsenous Acid with the Potassium Bicarbonate, and *one hundred and twenty-five* (125) *cubic centimeters* of Water, until solution is effected. Allow this to cool, add *six hundred and twenty-five* (625) *cubic centimeters* of Water, then the Bromine, and afterwards enough Water to make *one thousand* (1000) *cubic centimeters*. Let the mixture stand a few hours, agitating it occasionally, then filter.

This Solution contains an amount of Arsenic in combination, corresponding to 1 per cent. of Arsenous Acid.

Note.—The title "Solution of Bromide of Arsenic" (*Liquor Arsenii Bromidi*) which is often applied to Clemens' Solution or similar preparations, is a misnomer, since arsenic bromide cannot exist, as such, in presence of water, but is split up into hydrobromic and arsenous acids. The proportions of the ingredients, in the formula above given, have been adjusted, as closely as practicable, so as to yield definite compounds, viz.: arsenate and bromide of potassium.

In order to prevent injury to the balances by weighing a definite amount of Bromine, the plan suggested in the Note to No. 213 may be applied to this preparation, viz.: to prepare such a quantity of the latter at one time, as will be commensurate to the actual contents of an original vial of Bromine.

239. LIQUOR SACCHARINI.

Solution of Saccharin.

Saccharin, *seventy grammes*	70 Gm.
Sodium Bicarbonate, *thirty-three grammes*	33 Gm.
Alcohol, *two hundred and fifty cubic centimeters*	250 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Saccharin and the Sodium Bicarbonate in *six hundred and fifty* (650) *cubic centimeters* of Water, filter the solution, add the Alcohol to the filtrate, and pass enough Water through the filter to make *one thousand* (1000) *cubic centimeters*.

Each fluidrachm represents 4 grains of Saccharin.

Note.—The Saccharin directed in the above formula is, properly speaking, "anhydro-ortho-sulphamine-benzoic acid," an artificially prepared member of the so-called aromatic series of organic chemicals. It is a body having feebly acid properties, soluble in about 333 parts of water and in 33 parts of alcohol at 15° C. (59° F.). When neutralized by an alkali, it is quite soluble in water.

The Solution of Saccharin is intended to be used for sweetening liquids or solids, when the use of sugar is objectionable, or when a sweet taste is to be imparted to a liquid without increasing its density.

240. LIQUOR SERIPARUS.

Liquid Rennet.

Calves' Rennet, fresh, *one hundred grammes*	100 Gm.
Sodium Chloride, *forty grammes*	40 Gm.
Alcohol, *two hundred cubic centimeters*	200 Cc.
Water, *eight hundred cubic centimeters*	800 Cc.

Dissolve the Sodium Chloride in the Water, add the Alcohol, and macerate in this mixture the Rennet (or the washed mucous membrane of the fresh stomach of a suckling calf), during three days, under frequent agitation. Then filter.

Note.—If this liquid is to be used merely for curdling the milk, without separating the whey as a distinct layer, it should be added to the milk, previously warmed to a temperature of about 35° C. (95° F.), and the mixture should then be set aside undisturbed, until it coagulates. If the whey is to be separated, the Liquid Rennet should be added to the milk while cold, and the mixture heated to about 35° C. (95° F.), but not exceeding 40° C. (104° F.). One part of the liquid should coagulate between 200 and 300 parts of cows' milk.

241. LIQUOR SODII ARSENATIS, PEARSON.

Pearson's Solution of Sodium Arsenate.

Sodium Arsenate, in perfect crystals, *one gramme*	1 Gm.
Distilled Water, *six hundred cubic centimeters*	600 Cc.

Dissolve the Sodium Arsenate in the Distilled Water, and filter, if necessary.

Pearson's Solution of Sodium Arsenate may also be prepared as follows:

Solution of Sodium Arsenate (U. S. P.), *ten cubic centimeters* .	10 Cc.
Distilled Water, *ninety cubic centimeters*	90 Cc.

Mix the Solution of Sodium Arsenate with the Distilled Water.

This Solution contains about $\frac{1}{10}$ per cent. of anhydrous Sodium Arsenate

Note.—This preparation should not be confounded with the *Liquor Sodii Arsenatis*, U. S. P., which is ten times stronger than the above preparation. Pearson's Solution is recognized in the French Pharm., under the title *Soluté d'Arsenate de Soude*, (or *Solution Arsenicale de Pearson*). It is recommended that Pearson's Solution be dispensed only when expressly designated as "Pearson's."

242. LIQUOR SODII BORATIS COMPOSITUS.

Compound Solution of Sodium Borate.

Dobell's Solution.

Sodium Borate, *fifteen grammes*	15 Gm.
Sodium Bicarbonate, *fifteen grammes*	15 Gm.
Carbolic Acid, crystallized, *three grammes*	3 Gm.
Glycerin, *thirty-five cubic centimeters*	35 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Salts in about *five hundred* (500) *cubic centimeters* of Water, then add the Glycerin, and the Carbolic Acid previously liquefied by warming, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters.*

243. LIQUOR SODII CARBOLATIS.

Solution of Sodium Carbolate.

Phénol Sodique.

Carbolic Acid, crystallized, *fifty grammes*	50 Gm.
Soda (U. S. P.), *three and one-half grammes*	3.5 Gm.
Water, *forty-six and one-half grammes*	46.5 Gm.

Dissolve the Soda in the Water, add the Carbolic Acid, and warm gently, until it is dissolved.

This preparation should be made freshly, when wanted for use.

Note.—The formula is based upon that of the Germ. Pharm., (I., 1872).

244. LIQUOR SODII CITRATIS.

Solution of Sodium Citrate.

Mistura Sodii Citratis. Saturatio. Potio Riveri (Germ. Pharm.).

Citric Acid, *twenty grammes*	20 Gm.
Sodium Bicarbonate, *twenty-five grammes*	25 Gm.
Water, *one thousand cubic centimeters*	1000 Cc.

Dissolve the Citric Acid in the Water contained in a bottle, add the Sodium Bicarbonate, dissolve it by agitation, and immediately stopper the bottle securely.

This preparation should be freshly prepared when wanted for use.

Note.—The German Pharm. directs that, when "Saturatio" is prescribed, without any specification of the ingredients or strength, *Potio Riveri*, represented here by *Liquor Sodii Citratis*, be dispensed.

245. LIQUOR SODII CITRO-TARTRATIS EFFERVESCENS.

Effervescent Solution of Sodium Citro-Tartrate.

(Tartro-Citric Lemonade.)

Sodium Bicarbonate, *twenty-six grammes*	26 Gm.
Tartaric Acid, *twenty-four grammes*	24 Gm.
Citric Acid, *two grammes*	2 Gm.
Syrup of Citric Acid (U. S. P.), *fifty cubic centimeters*	50 Cc.
Water, a sufficient quantity	
To make three hundred and fifty cubic centimeters	350 Cc.

Dissolve *twenty-four* (24) *grammes* of the Sodium Bicarbonate in *two hundred and fifty* (250) *cubic centimeters* of Water, add the Tartaric and Citric Acids, and, when they are dissolved, the Syrup of Citric Acid. Filter the solution into a strong bottle of about *three hundred and sixty* (360) *cubic centimeters* capacity, and pass enough Water through the filter to make the filtrate measure *three hundred and twenty* (320) *cubic centimeters*. Dissolve the remainder of the Sodium Bicarbonate (2 grammes) in *thirty* (30) *cubic centimeters* of Water, filter the solution, pour it on top of the solution in the bottle, which close immediately with a cork, and secure it with twine. Then shake the bottle.

246. LIQUOR SODII OLEATIS.

Solution of Sodium Oleate.

White Castile Soap, dry and powdered, *six hundred and twenty-five grammes*	625 Gm.
Water, a sufficient quantity	
To make ten thousand cubic centimeters	10,000 Cc.

Mix the Castile Soap with *twenty-five hundred* (2500) *cubic centimeters* of Water so as to produce a uniform and gelatinous mixture. Then add *sixty-five hundred* (6500) *cubic centimeters* more of Water, apply heat until the Soap is dissolved, allow the liquid to cool and add enough Water to make it measure *ten thousand* (10,000) *cubic centimeters*.

Note.—This solution is intended to be used in the preparation of Oleates.

247. LIQUOR STYCHNINÆ ACETATIS.

Solution of Strychnine Acetate.

Hall's Solution of Strychnine.

Strychnine Acetate, *two and one-tenth grammes*	2.1 Gm.
Diluted Acetic Acid (U. S. P.), *thirty-five cubic centimeters*	35 Cc.
Alcohol, *two hundred and fifty cubic centimeters*	250 Cc.
Compound Tincture of Cardamom (U. S. P.), *ten cubic centimeters*	10 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Strychnine Acetate in about *five hundred* (500) *cubic centimeters* of Water mixed with the Diluted Acetic Acid, then add the Alcohol, Compound Tincture of Cardamom, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters*. Allow the mixture to stand a few days, if convenient, and filter.

Each fluidrachm contains ⅛ grain of Strychnine Acetate.

Note.—The Brit. Pharm. directs a *Liquor Strychninæ Hydrochloratis* (with synonym: *Liquor Strychniæ*) which is much stronger, and should not be confounded with the above preparation. It should never be dispensed, unless expressly designated. It may be prepared by dissolving 1 grain of crystallized Strychnine (alkaloid) in 80 minims of Water with the aid of 2 drops of Diluted Hydrochloric Acid, and then adding 20 minims of Alcohol. The product contains ⅝ grain of Strychnine in each fluidrachm.

248. LIQUOR ZINCI ET ALUMINI COMPOSITUS.

Compound Solution of Zinc and Aluminum.

Zinc Sulphate, *one thousand grammes*	1000 Gm.
Aluminum Sulphate, *one thousand grammes*	1000 Gm.
Naphthol, *three grammes*	3 Gm.
Oil of Thyme, *ten cubic centimeters*	10 Cc.
Water, a sufficient quantity	
To make five thousand cubic centimeters	5000 Cc.

Dissolve the Zinc Sulphate and the Aluminum Sulphate in *five thousand* (5000) *cubic centimeters* of Water, by the aid of heat, add the Naphthol and Oil of Thyme, and shake the mixture occasionally, in a stoppered bottle, until it cools. Set it aside for a few days, if convenient, and then pass it through a wetted filter, following it with enough Water to make *five thousand* (5000) *cubic centimeters*.

Note.—The commercial Aluminum Sulphate (*not* Alum) may be used for this preparation. This generally contains a trace of iron, but by allowing the liquid to stand, this will be gradually precipitated.

249. LIQUOR ZINCI ET FERRI COMPOSITUS.

Compound Solution of Zinc and Iron.

Deodorant Solution.

Zinc Sulphate, *one thousand grammes*	1000 Gm.
Ferrous Sulphate, *one thousand grammes*	1000 Gm.
Copper Sulphate, *three hundred and twenty-five grammes*	325 Gm.
Naphthol, *three grammes*	3 Gm.
Oil of Thyme, *ten cubic centimeters*	10 Cc.
Diluted Hypophosphorous Acid (U. S. P.), *twenty cubic centimeters*	20 Cc.
Water, a sufficient quantity	
To make five thousand cubic centimeters	5000 Cc.

Dissolve the Zinc Sulphate, Ferrous Sulphate, and Copper Sulphate, in *five thousand* (5000) *cubic centimeters* of boiling Water, add the Naphthol, and Oil of Thyme, and shake the mixture occasionally, in a stoppered bottle, until it is cold. Then add the Diluted Hypophosphorous Acid, filter the liquid through a wetted filter, and lastly, pass enough Water through the filter to make *five thousand* (5000) *cubic centimeters*.

Note.—This solution is used as a simple deodorant and antiseptic for common domestic use, when it is unnecessary or impracticable to employ more powerful agents.

When a deodorant solution is required for purposes where *iron* is objectionable, as for instance, when woven fabrics are to be steeped in it, the Compound Solution of Zinc and Aluminum (F. 248), may be employed.

250. LIQUOR ZINCIBERIS.

Solution of Ginger.

Soluble Essence of Ginger.

Fluid Extract of Ginger (U. S. P.), *three hundred and thirty-five cubic centimeters*	335 Cc.
Pumice, in moderately fine powder, *one hundred grammes*	100 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Pour the Fluid Extract of Ginger into a bottle, add to it the Pumice, and shake the mixture thoroughly and repeatedly in the course of several hours. Then add the Water in portions of about *one hundred and twenty-five* (125) *cubic centimeters*, shaking well and frequently after each addition. When all is added, repeat the agitation occasionally during twenty-four hours, then filter, returning the first portions of the filtrate until it runs through clear, and, if necessary, pass enough Water through the filter to make *one thousand* (1000) *cubic centimeters*.

251. LOTIO ADSTRINGENS.

Astringent Lotion.

Warren's Styptic.

Sulphuric Acid (U. S. P.), *thirty-eight cubic centimeters*	38 Cc.
Oil of Turpentine, *thirty-one cubic centimeters*	31 Cc.
Alcohol, *thirty-one cubic centimeters*	31 Cc.

To the Sulphuric Acid, contained in a wedgewood mortar, slowly add the Oil of Turpentine, in small portions at a time, constantly stirring. Allow the mixture to cool, then add the Alcohol cautiously, in the same manner, and continue stirring until no more fumes arise. When the liquid is cold, pour it into a glass-stoppered bottle.

Note.—In preparing this mixture, caution should be used, so that the temperature may not rise too high. Particular care is to be observed, if a larger quantity of this mixture is to be prepared. In this case it is preferable to prepare it in several portions.

252. LOTIO FLAVA.

Yellow Lotion.

Yellow Wash. Aqua Phagedænica Flava.

Corrosive Chloride of Mercury, *three grammes*	3 Gm.
Boiling Water,	
Solution of Lime (U. S. P.), of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Corrosive Chloride of Mercury in *thirty-five* (35) *cubic centimeters* of boiling Water, and add the solution to a sufficient quantity of Solution of Lime, to make *one thousand* (1000) *cubic centimeters.*

This mixture should be well agitated whenever any of it is to be dispensed.

253. LOTIO NIGRA.

Black Lotion.

Black Wash. Aqua Phagedænica Nigra.

Mild Chloride of Mercury, *seven and one-half grammes* . . .	7.5 Gm.
Water,	
Solution of Lime (U. S. P.), of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Mild Chloride of Mercury with *thirty-five* (35) *cubic centimeters* of Water, and gradually add a sufficient quantity of Solution of Lime, to make *one thousand* (1000) *cubic centimeters.*

This mixture should be well agitated, whenever any of it is to be dispensed.

254. LOTIO PLUMBI ET OPII.

Lotion of Lead and Opium.

Lead and Opium Wash.

Lead Acetate, *seventeen and one-half grammes*	17.5 Gm.
Tincture of Opium (U. S. P.), *thirty-five cubic centimeters* . . .	35 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Lead Acetate in about *six hundred and fifty* (650) *cubic centimeters* of Water, add the Tincture of Opium, and enough Water to make *one thousand* (1000) *cubic centimeters.*

This mixture should be well agitated, whenever any of it is to be dispensed.

255. MISTURA ACACIÆ.

Mixture of Acacia.

Mixtura Gummosa (Germ. Pharm. I.).

Acacia, in coarse powder, *seventy-five grammes*	75 Gm.
Sugar, *seventy-five grammes*	75 Gm.
Water, *eight hundred and fifty cubic centimeters*	850 Cc.

Dissolve the Acacia and Sugar in the Water.

This preparation should be freshly made, when wanted for use.

256. MISTURA ADSTRINGENS ET ESCHAROTICA.

Astringent and Escharotic Mixture.

Villate's Solution.

Solution of Lead Subacetate (U. S. P.), *one hundred cubic centimeters*	100 Cc.
Copper Sulphate, *sixty-five grammes*	65 Gm.
Zinc Sulphate, *sixty-five grammes*	65 Gm.
Diluted Acetic Acid (U. S. P.), *eight hundred and fifty cubic centimeters*	850 Cc.

Dissolve the Copper Sulphate and Zinc Sulphate in the Diluted Acetic Acid, add the Solution of Lead Subacetate, and agitate thoroughly. Set the mixture aside, so that the precipitate may subside. Then decant, or siphon off, the clear liquid and preserve it for use.

Note.—In attempting to pass the liquid through a filter, it will usually be found that the finely divided precipitate of lead sulphate will partially pass along with it. This may be prevented (in this and many similar cases) by adding to the mixture a small quantity of starch, thoroughly incorporating this by agitation, and pouring the mixture on the previously wetted filter. The first portions of the filtrate are poured back until it runs through clear.

257. MISTURA AMMONII CHLORIDI.

Mixture of Ammonium Chloride.

Mistura (or *Mixtura*) *Solvens Simplex.*

Ammonium Chloride, *twenty-five grammes*	25 Gm.
Purified Extract of Glycyrrhiza (F. 158), *twenty-five grammes*	25 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the solids in a sufficient quantity of Water to make *one thousand* (1000) *cubic centimeters.*

Note.—Sometimes a *Mistura* (or *Mixtura*) *Solvens Stibiata* is prescribed. This may be prepared by dissolving *thirty centigrammes* (0.30 Gm.) of Antimony and Potassium Tartrate in *one thousand* (1000) *cubic centimeters* of *Mistura Ammonii Chloridi.*

258. MISTURA CAMPHORÆ ACIDA.

Acid Camphor Mixture.

Mistura Antidysenterica. Hope's Mixture.

Nitric Acid (U. S. P.), *seventeen and one-half cubic centimeters*	17.5 Cc.
Tincture of Opium (U. S. P.), *twelve cubic centimeters*	12 Cc.
Camphor Water (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Nitric Acid with about *five hundred cubic centimeters* of Camphor Water, add the Tincture of Opium, and lastly, enough Camphor Water to make *one thousand* (1000) *cubic centimeters*.

259. MISTURA CAMPHORÆ AROMATICA.

Aromatic Camphor Mixture.

Parrish's Camphor Mixture.

Compound Tincture of Lavender (U. S. P.), *two hundred and fifty cubic centimeters*	250 Cc.
Sugar, *thirty-five grammes*	35 Gm.
Camphor Water (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Compound Tincture of Lavender with about *five hundred* (500) *cubic centimeters* of Camphor Water, dissolve the Sugar in the mixture, and add enough Camphor Water to make *one thousand* (1000) *cubic centimeters*.

260. MISTURA CARMINATIVA.

Carminative Mixture.

Dalby's Carminative.

Magnesium Carbonate, *sixty-five grammes*	65 Gm.
Potassium Carbonate, *three grammes*	3 Gm.
Tincture of Opium (U. S. P.), *twenty-five cubic centimeters*	25 Cc.
Oil of Caraway, *one-half cubic centimeter*	0.5 Cc.
Oil of Fennel, *one-half cubic centimeter*	0.5 Cc.
Oil of Peppermint, *one-half cubic centimeter*	0.5 Cc.
Syrup (U. S. P.), *one hundred and sixty cubic centimeters*	160 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Oils with about *ten* (10) *grammes* of Magnesium Carbonate, and *seven hundred and fifty* (750) *cubic centimeters* of Water gradually added. Then add the remainder of the Magnesium Carbonate and the other ingredients, and lastly, add enough Water to make *one thousand cubic centimeters*.

This preparation should be freshly made, when wanted for use.

Each fluidounce represents about 1 grain of Opium.

261. MISTURA CHLORALI ET POTASSII BROMIDI COMPOSITA.

Compound Mixture of Chloral and Potassium Bromide.

Chloral (U. S. P.), *two hundred and fifty grammes*	250 Gm.
Potassium Bromide *two hundred and fifty grammes*	250 Gm.
Extract of Indian Cannabis (U. S. P.), *two grammes*	2 Gm.
Extract of Hyoscyamus (U. S. P.), *two grammes*	2 Gm.
Alcohol, *sixty cubic centimeters*	60 Cc.
Tincture of Quillaja (U. S. P.), *sixty-five cubic centimeters*	65 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Chloral and Potassium Bromide in *six hundred* (600) *cubic centimeters* of Water, dissolve in this solution the Extract of Hyoscyamus, and add the Tincture of Quillaja. Then dissolve the Extract of Indian Cannabis in the Alcohol, and add this solution gradually, and under shaking, to that first prepared. Finally, add enough Water to make *one thousand cubic centimeters.*

This preparation should be shaken whenever any of it is to be dispensed.

Each fluidrachm contains 15 grains each of Chloral and of Potassium Bromide, and ⅛ grain each of Extract of Indian Cannabis and of Extract of Hyoscyamus.

Note.—The resinous Extract of Indian Cannabis is merely held in suspension by means of the Tincture of Quillaja, as it is practically insoluble in the liquid. If the mixture is filtered, the resin will remain on the filter.

262. MISTURA CHLOROFORMI ET CANNABIS INDICÆ COMPOSITA.

Compound Mixture of Chloroform and Cannabis Indica.

Chloroform Anodyne.

Chloroform, *one hundred and twenty-five cubic centimeters*	125 Cc.
Ether, *thirty-five cubic centimeters*	35 Cc.
Tincture of Indian Cannabis (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Tincture of Capsicum (U. S. P.), *sixty-five cubic centimeters*	65 Cc.
Morphine Sulphate, *two and one-half grammes*	2.5 Gm.
Oil of Peppermint, *two cubic centimeters*	2 C.c
Glycerin, *one hundred and twenty-five cubic centimeters*	125 Cc.
Water, *sixty-five cubic centimeters*	65 Cc.
Alcohol, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Oil of Peppermint in *five hundred* (500) *cubic centimeters* of Alcohol, add the Chloroform, Ether, and the Tinctures. Mix well, and add the Morphine Sulphate, previously dissolved in the Water and

Glycerin. Finally, add enough Alcohol to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents about 7½ minims of Chloroform; 7½ minims of Tincture of Indian Cannabis; 3¾ minims of Tincture of Capsicum; and ⅛ of a grain of Morphine Sulphate.

263. MISTURA CONTRA DIARRHOEAM.

Diarrhœa Mixture.

Cholera Mixture.

1. Tincture of Opium (U. S. P.),
Tincture of Capsicum (U. S. P.),
Tincture of Rhubarb (U. S. P.),
Spirit of Camphor (U. S. P.),
Spirit of Peppermint (U. S. P.), of each, *twenty cubic centimeters* . . . . . 20 Cc.

Mix them, and filter.

Note.—The formula above given, which appears to be that in most general use, is also known under the name of "Sun Mixture."

Of other similar preparations, in more or less general use, the following may be mentioned here:

2. *Loomis' Diarrhœa Mixture.*
Tincture of Opium (U. S. P.), *twelve and one-half cubic centimeters* . . . . . 12.5 Cc.
Tincture of Rhubarb (U. S. P.), *twelve and one-half cubic centimeters* . . . . . 12.5 Cc.
Compound Tincture of Catechu (U. S. P.), *twenty-five cubic centimeters* . . . . . 25 Cc.
Oil of Sassafras, *one cubic centimeter* . . . . . 1 Cc.
Compound Tincture of Lavender (U. S. P.), *forty-nine cubic centimeters* . . . . . 49 Cc.

3. *Squibb's Diarrhœa Mixture.*
Tincture of Opium (U. S. P.), *twenty cubic centimeters* . . . . 20 Cc.
Tincture of Capsicum (U. S. P.), *twenty cubic centimeters* . . . 20 Cc.
Spirit of Camphor (U. S. P.), *twenty cubic centimeters* . . . . 20 Cc.
Chloroform (U. S. P.), *seven and one-half cubic centimeters* . . 7.5 Cc.
Alcohol, *thirty-two and one-half cubic centimeters* . . . . . 32.5 Cc.

4. *Thielemann's Diarrhœa Mixture.*
Wine of Opium (U. S. P.), *twenty five cubic centimeters* . . . 25 Cc.
Tincture of Valerian (U. S. P.), *thirty-seven and one-half cubic centimeters* . . . . . 37.5 Cc.
Ether (U. S. P.), *twelve and one-half cubic centimeters* . . . . 12.5 Cc.
Oil of Peppermint, *three cubic centimeters* . . . . . 3 Cc.
Fluid Extract of Ipecac (U. S. P.), *three-fourths of a cubic centimeter.* . . . . . 0.75 Cc.
Alcohol, *twenty-one and one-fourth cubic centimeters* . . . . . 21.25 Cc.

This preparation is practically identical with the *Mistura Thielemanni* of the Swedish Pharm.

5. Velpeau's Diarrhœa Mixture.

Tincture of Opium (U. S. P.),
Compound Tincture of Catechu (U. S. P.),
Spirit of Camphor (U. S. P.), of each, *thirty-three and one-third cubic centimeters* . . . . . 33.33 Cc.

264. MISTURA COPAIBÆ COMPOSITA.

Compound Copaiba Mixture.

1. Lafayette Mixture.

Copaiba, *one hundred and twenty-five cubic centimeters*	125 Cc.
Spirit of Nitrous Ether (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Compound Tincture of Lavender (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Solution of Potassa (U. S. P.), *thirty-five cubic centimeters*.	35 Cc.
Syrup (U. S. P.), *three hundred and twenty-five cubic centimeters*	325 Cc.
Mucilage of Dextrin (F. 277), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Copaiba with the Solution of Potassa and the Spirit of Nitrous Ether. Then add the Compound Tincture of Lavender, and lastly, the Syrup and Mucilage of Dextrin. Mix the whole thoroughly by shaking.

This mixture should be well agitated, whenever any of it is to be dispensed.

Each fluidrachm contains 7½ minims of Copaiba.

Note.—The above mixture has usually been, and may be, prepared with Mucilage of Acacia; but if Mucilage of Dextrin be used, it will keep for a longer time without separating.

A mixture of somewhat similar composition, in considerable use in some parts of the country, is the following:

2. Chapman's Mixture.

Copaiba, *two hundred and fifty cubic centimeters*	250 Cc.
Spirit of Nitrous Ether (U. S. P.), *two hundred and fifty cubic centimeters*	250 Cc.
Compound Tincture of Lavender (U. S. P.), *sixty-five cubic centimeters*	65 Cc.
Tincture of Opium (U. S. P.), *thirty cubic centimeters*	30 Cc.
Mucilage of Acacia (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

265. MISTURA EXPECTORANS, STOKES.

Stokes' Expectorant Mixture.

Stokes' Expectorant.

Ammonium Carbonate, *seventeen and one-half grammes* . . .	17.5	Gm.
Fluid Extract of Senega (U. S. P.), *thirty-five cubic centimeters.*	35	Cc.
Fluid Extract of Squill (U. S. P.), *thirty-five cubic centimeters.*	35	Cc.
Camphorated Tincture of Opium (U. S. P.), *one hundred and seventy-five cubic centimeters*	175	Cc.
Water, *one hundred cubic centimeters*	100	Cc.
Syrup of Tolu (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Ammonium Carbonate in the Water, add the Fluid Extracts and Tincture, and lastly, enough Syrup of Tolu to make *one thousand* (1000) *cubic centimeters.*

266. MISTURA GUAIACI.

Mixture of Guaiac.

Guaiac (U. S P.), in powder, *twenty-five grammes.*	25	Gm.
Sugar, *twenty-five grammes*	25	Gm.
Acacia, in fine powder, *fifteen grammes*	15	Gm.
Cinnamon Water (U. S. P.), *one thousand cubic centimeters* . .	1000	Cc.

Triturate the powdered Guaiac with the Sugar and Acacia, then gradually add the Cinnamon Water, and mix thoroughly.

This mixture should be well agitated, whenever any of it is to be dispensed.

Note.—This preparation is practically identical with the *Mistura Guaiaci* of the Brit. Pharm.

267. MISTURA MAGNESIÆ ET ASAFOETIDÆ.

(U. S. P., 1880.)

Mixture of Magnesia and Asafetida.

Dewees' Carminative.

Magnesium Carbonate, *fifty grammes*	50	Gm.
Tincture of Asafetida, *seventy-five cubic centimeters*	75	Cc.
Tincture of Opium, *ten cubic centimeters*	10	Cc.
Sugar, *one hundred grammes*	100	Gm.
Distilled Water, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Rub the Magnesium Carbonate and Sugar, in a mortar, with the Tincture of Asafetida and the Tincture of Opium. Then gradually add enough Distilled Water to make the mixture measure *one thousand* (1000) *cubic centimeters.*

268. MISTURA OLEO-BALSAMICA.

Oleo-balsamic Mixture.

Mixtura Oleoso-balsamica (Germ. Pharm.). *Balsamum Vitæ Hoffmanni.*

Oil of Lavender, *four cubic centimeters*	4 Cc.
Oil of Thyme, *four cubic centimeters*	4 Cc.
Oil of Lemon, *four cubic centimeters*	4 Cc.
Oil of Mace, *four cubic centimeters*	4 Cc.
Oil of Orange Flowers, *four cubic centimeters*	4 Cc.
Oil of Cloves, *three and one-half cubic centimeters.*	3.5 Cc.
Oil of Cinnamon, *three and one-half cubic centimeters.*	3.5 Cc.
Balsam of Peru, *ten and one-half cubic centimeters*	10.5 Cc,
Alcohol, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Oils and the Balsam of Peru in the Alcohol, let the solution stand a few days, and then filter.

269. MISTURA OLEI PICIS.

Mixture of Oil of Tar.

Mistura Picis Liquidæ. Tar Mixture.

Purified Extract of Glycyrrhiza (F. 158), *sixty-five grammes.*	65 Gm.
Oil of Tar (U. S. P.), *thirty-five cubic centimeters*	35 Cc.
Sugar, *two hundred and fifty grammes*	250 Gm.
Chloroform (U. S. P.), *ten cubic centimeters.*	10 Cc,
Oil of Peppermint, *three cubic centimeters*	3 Cc.
Alcohol, *one hundred and sixty cubic centimeters*	160 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Add the Purified Extract of Glycyrrhiza and Sugar to *six hundred* (600) *cubic centimeters* of Water, contained in a covered vessel, and heat the mixture to boiling until the Extract and Sugar are dissolved. Then add the Oil of Tar, cover the vessel, and allow the contents to cool, stirring occasionally. Next add the Chloroform and Oil of Peppermint previously dissolved in the Alcohol, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters.*

This mixture should be well agitated, whenever any of it is to be dispensed.

270. MISTURA RHEI COMPOSITA.

Compound Mixture of Rhubarb.

Squibb's Rhubarb Mixture.

Fluid Extract of Rhubarb (U. S. P.), *twelve cubic centimeters.*	12 Cc.
Fluid Extract of Ipecac (U. S. P.), *two cubic centimeters*	2 Cc.
Sodium Bicarbonate, *twenty-four grammes*	24 Gm.
Glycerin, *two hundred and fifty cubic centimeters*	250 Cc.
Peppermint Water (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Sodium Bicarbonate in about *five hundred* (500) *cubic centimeters* of Peppermint Water, then add the Fluid Extracts and Glycerin, and lastly, enough Peppermint Water to make *one thousand* (1000) *cubic centimeters.*

271. MISTURA SASSAFRAS ET OPII.

Mixture of Sassafras and Opium.

Mistura Opii Alkalina. Godfrey's Cordial.

Oil of Sassafras, *one cubic centimeter*	1 Cc.
Tincture of Opium (U. S. P.), *thirty-five cubic centimeters*	35 Cc.
Alcohol, *fifty cubic centimeters*	50 Cc.
Potassium Carbonate, *eight grammes*	8 Gm.
Molasses, *three hundred and twenty-five cubic centimeters*	325 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Tincture of Opium with the Alcohol in which the Oil of Sassafras had previously been dissolved. Dissolve the Potassium Carbonate in about *five hundred* (500) *cubic centimeters* of Water, mix this with the Molasses, then add the mixture first prepared, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters.* Allow the mixture to become clear by standing, then pour off the liquid portion and preserve it for use.

Each fluidrachm contains 2 minims of Tincture of Opium, corresponding to about $\frac{1}{5}$ grain of Opium.

272. MISTURA SODÆ ET MENTHÆ.

Mixture of Soda and Spearmint.

Soda Mint.

Sodium Bicarbonate, *fifty grammes*	50 Gm.
Aromatic Spirit of Ammonia (U. S. P.), *ten cubic centimeters.*	10 Cc.
Spearmint Water (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Sodium Bicarbonate in about *seven hundred and fifty* (750) *cubic centimeters* of Spearmint Water, add the Aromatic Spirit of Ammonia and enough Spearmint Water to make *one thousand* (1000) *cubic centimeters.* Filter, if necessary.

273. MISTURA SPLENETICA.

Splenetic Mixture.

Spleen Mixture. Gadberry's Mixture.

Sulphate of Iron, *fourteen grammes*	14 Gm.
Quinine Sulphate, *fourteen grammes*	14 Gm.
Nitric Acid (U. S. P.), *fourteen cubic centimeters*	14 Cc.
Potassium Nitrate, *forty-two grammes*	42 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Sulphate of Iron, reduced to powder, with the Nitric Acid previously mixed with an equal volume of Water. When effervescence has ceased, warm the mixture gently, until it no longer evolves visible vapors of a yellowish tint. Then add to it the Quinine Sulphate, the Potassium Nitrate, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters*. When solution has been effected, filter.

274. MISTURA SULPHURICA ACIDA.

Sulphuric Acid Mixture.

Mixtura Sulphurica Acida (Germ. Pharm.) *Haller's Acid Elixir.*

Sulphuric Acid (U. S. P.), *two hundred and fifty grammes* . .	250 Gm.
Alcohol, a sufficient quantity	
To make one thousand grammes	1000 Gm.

Add the Acid very gradually to *seven hundred and fifty* (750) *grammes* of Alcohol, contained in a flask, agitating after each addition, and taking care that the temperature of the mixture be not allowed to rise above 50° C. (122° F.) When the mixture is cold, add enough Alcohol, if necessary, to make *one thousand* (1000) *grammes.*

Note.—The same product may be obtained, approximately, by carefully and slowly adding 1 volume of Sulphuric Acid to 7 volumes of Alcohol, and this method may be used when small quantities are required for immediate use in a prescription.

275. MUCILAGO CHONDRI.

Mucilage of Irish Moss.

Irish Moss, *thirty grammes*	30 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Wash the Irish Moss with cold Water, then place it in a suitable vessel, add *one thousand* (1000) *cubic centimeters* of Water, and heat it, on a boiling water-bath, for fifteen minutes, frequently stirring. Then strain it through muslin, and pass enough Water through the strainer to make the liquid, when cold, measure *one thousand* (1000) *cubic centimeters.*

Mucilage of Irish Moss may also be prepared in the following manner:

Irish Moss Gelatin (F. 184), *twenty grammes*	20 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Heat the Irish Moss Gelatin with *one thousand* (1000) *cubic centimeters* of Water, at a boiling temperature, until it is completely dissolved. Then allow the solution to cool, and add enough Water, if necessary, to make up the volume to *one thousand* (1000) *cubic centimeters.*

Note.—Mucilage of Irish Moss, thus prepared, is well adapted for the preparation of emulsions of fixed oils. If it is, however, required for admixture with *clear* liquids, it should be diluted, when freshly made, and while still hot, with about 3 volumes of boiling water, filtered, and the filtrate evaporated to the volume corresponding to the proportions above given. The filtration may be greatly facilitated by filling the filter loosely with absorbent cotton, and pouring the liquid upon the latter.

Mucilage of Irish Moss may be preserved for some time by transferring it, while hot, into bottles, which should be filled to the neck, then pouring a layer of Olive Oil on top, securely stoppering the bottles, and keeping them, in an upright position, in a cool place. When the Mucilage is wanted for use, the layer of oil may be removed by means of absorbent cotton.

276. MUCILAGO CYDONII.

(U. S. P., 1880.)

Mucilage of Cydonium.

Cydonium, *two grammes*	2 Gm.
Distilled Water, *one hundred cubic centimeters*	100 Cc.

Macerate the Cydonium for half an hour, in a covered vessel, with the Distilled Water, frequently agitating. Then drain the liquid through muslin without pressure.

This preparation should be freshly made, when required for use.

277. MUCILAGO DEXTRINI.

Mucilage of Dextrin.

Dextrin, *three hundred and thirty-five grammes*	335 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix them in a tared vessel, and heat the mixture, under constant stirring, to near boiling, until the Dextrin is dissolved and a limpid liquid results. Then restore any loss of water by evaporation, strain the liquid through muslin, and allow it to cool short of gelatinizing, when it will be ready for immediate use.

Note.—If the Mucilage is not at once to be used for preparing emulsions or other mixtures, transfer it, while hot, to bottles, which should be filled to the neck. Then pour into each bottle a sufficient quantity of Olive Oil to form a protecting layer, and when the mucilage has gelatinized, securely cork the bottles, and keep them in a cool place, in an upright position.

When gelatinized Mucilage of Dextrin is to be used for the preparation of emulsions or for other mixtures, pour off the protecting layer of oil from the surface, remove the remainder of the oil by a pellet of absorbent cotton, and warm the bottle gently, until the Mucilage is liquefied. Then allow it to cool short of gelatinizing.

The kind of Dextrin suitable for this preparation is the commercial, *white*

variety, provided it still contains some unaltered or only partially altered starch, and forms a jelly on cooling, when made into a mucilage after the formula above given. The yellow variety, which is completely soluble in about 2 parts of cold water, will not answer the purpose.

278. MUCILAGO SALEP.

Mucilage of Salep.

Salep, in fine powder, *ten grammes*	10 Gm.
Cold Water, *one hundred cubic centimeters*	100 Cc.
Boiling Water, *nine hundred cubic centimeters*	900 Cc.

Place the powdered Salep into a flask containing the Cold Water, and shake until the powder is divided. Then add the Boiling Water, and shake the mixture continuously until it has cooled to 25° C. (77° F.), or below this temperature. The cooling may be hastened by frequent and brief immersion of the flask in cold water.

Mucilage of Salep should be freshly made, when wanted for use.

Note.—If Sugar or Syrup is prescribed in the same mixture with Mucilage of Salep, it is preferable to triturate the required quantity of powdered Salep with either of the former, as the case may be, and then to add rapidly the proportionate amount of Boiling Water.

279. OLEA INFUSA.

Infused Oils.

The Dry Herb, in moderately coarse (No. 40) powder, *two hundred grammes*	200 Gm.
Alcohol, *one hundred and fifty grammes*	150 Gm.
Water of Ammonia (U. S. P.), *four grammes*	4 Gm.
Lard Oil, *five hundred grammes*	500 Gm.
Cotton Seed Oil, *five hundred grammes*	500 Gm.

Moisten the powdered Herb with a sufficient quantity of the Alcohol and Water of Ammonia previously mixed, then pack it tightly into a stone or enamelled iron vessel of suitable capacity, pour on the remainder of the ammoniated Alcohol, cover it well, and allow the mixture to macerate for twenty-four hours. Then add *one hundred and twenty* (120) *grammes* of the mixed Oils, digest, under frequent agitation, during twelve hours, at a temperature between 50° and 60° C. (122° to 140° F.), transfer the mixture to a strainer, and express strongly. To the residue, returned to the vessel, add the remainder of the Oils, digest and express in the same manner, and unite the expressed portions.

Note.—This process is a modification of that prescribed by the *Germ. Pharm.* The Alcohol and free ammonia are dissipated during the digestion. Infused Oils are usually prepared only from so-called narcotic plants, but it is known that only a portion of their active constituents is taken up by the oil. The above process is to be used for the preparation of *Oleum Hyoscyami* of the Germ. Pharm. and similar infused oils.

280. OLEATUM ACONITINÆ.

Oleate of Aconitine.

Aconitine, alkaloid, *two grammes*	2 Gm.
Oleic Acid, *ninety-eight grammes*	98 Gm.

Triturate the Aconitine with a small portion of the Oleic Acid in a mortar, then incorporate the remainder of the Oleic Acid, and stir the mixture frequently until the alkaloid is dissolved.

Note.—The market affords a variety of Aconitines made by different processes, by different manufacturers, and of greatly different potency. Only the pure crystallized or crystallizable alkaloid, prepared by Duquesnel's method, or at least one equal to it in strength, should be used for this preparation.

281. OLEATUM PLUMBI.

Lead Oleate.

Lead Acetate, *seventy-five grammes*	75 Gm.
Solution of Sodium Oleate (F. 246), *two thousand cubic centimeters*	2000 Cc.
Acetic Acid (U. S. P.),	
Water, each,	a sufficient quantity.

Dissolve the Lead Acetate in *four thousand* (4000) *cubic centimeters* of Water. Should the solution be turbid or opalescent, add to it Acetic Acid, in drops, until it has become clear. Then filter it, if necessary, through a pellet of absorbent cotton placed in the neck of a funnel, and mix it slowly, and under constant stirring, with the Solution of Sodium Oleate. Heat the mixture to boiling, transfer it to a strainer, and when the liquid has drained off, wash the residue with *four thousand* (4000) *cubic centimeters* of boiling Water. Lastly, take the mass from the strainer, remove any occluded Water by pressure, and transfer it, while warm and soft, to suitable vessels.

The product contains an amount of Lead corresponding to about 28 per cent. of Lead Oxide.

Note.—The theoretical yield of Lead Oleate obtainable from 75 grammes of lead acetate is 143 grammes; in practice, about 125 grammes will be obtained. Lead Oleate prepared by the above process is of about the consistence of lead-plaster, and may be converted into an ointment by mixing with it such a proportion of oleic acid as may be required.

282. OLEATUM QUININÆ.

Oleate of Quinine.

Quinine (U. S. P.), dried at 100° C. (212° F.) until it ceases to lose weight, *twenty-five grammes*	25 Gm.
Oleic Acid, *seventy-five grammes*	75 Gm.

Triturate the Quinine with the Oleic Acid, gradually added, then apply a gentle heat, and stir frequently, until the Quinine is dissolved.

The product contains 25 per cent. of dry Quinine.

Note.—When the official Quinine ($C_{20}H_{24}N_2O_2.3H_2O$) is not available, the quantity corresponding to 25 grammes of dry Quinine may be prepared as follows: Take 34 grammes of official Quinine Sulphate, dissolve it in 200 grammes of Water with the aid of a sufficient quantity of Diluted Sulphuric Acid, then precipitate the Quinine by means of Water of Ammonia, added, under constant stirring, until it is in slight excess. Transfer the magma to a close muslin strainer, previously wetted, allow the liquid to drain off, and wash the precipitate with ice-cold Water, until the washings are practically tasteless, but using not more than about 200 grammes of Water. Lastly, dry the precipitate.

The theoretical quantity of dry quinine obtainable from 34 grammes of the sulphate is 25.27 grammes. In practice, approximately 25 grammes will be obtained.

283. OLEATUM ZINCI.

Zinc Oleate.

Zinc Acetate, crystallized, *one hundred and fifteen grammes* . . **115 Gm.**
Solution of Sodium Oleate (F. 246), *five thousand cubic centimeters* . . . . . **5000 Cc.**
Water . . . . . **a sufficient quantity.**

Dissolve the Zinc Acetate in *ten thousand* (10,000) *cubic centimeters* of cold Water, filter the solution, if necessary, through a pellet of absorbent cotton placed in the neck of a funnel, and then mix it slowly, and under constant stirring, with the Solution of Sodium Oleate. Transfer the mixture to a wetted muslin strainer, and when the liquid has drained off, wash the precipitate with Water, until the washings are practically tasteless. Lastly, dry the precipitate, spread on paper, by exposure to dust-free air, without heat.

The product contains an amount of Zinc corresponding to about 13 per cent. of Zinc Oxide.

Note.—The theoretical yield of Zinc Oleate obtainable from 115 grammes of zinc acetate is 287.5 grammes; in practice, about 265 grammes will be obtained. Zinc Oleate, prepared by the above process, is in the form of a soft, white powder, and may be converted into a plaster or ointment by mixing it with such a proportion of oleic acid as may be required.

284. OLEOSACCHARA.

Oil-Sugars.

Elæosacchara (Germ. Pharm.).

Any Volatile Oil, *one drop* . . . . . **1 Drop.**
Sugar, *two grammes* . . . . . **2 Gm.**

Triturate the Sugar with the Volatile Oil to a fine powder.

This preparation should be freshly made, when wanted for use.

Note.—When *Elæosaccharum Anisi, E. Fœniculi, E. Menthæ Piperitæ*, etc., etc., are prescribed, these are to be prepared from the corresponding essential oils, according to the above formula.

285. OLEUM CARBOLATUM.

Carbolized Oil.

Carbolic Acid, *five grammes*	5 Gm.
Cotton Seed Oil, *ninety-five grammes*	95 Gm.

Melt the Carbolic Acid with a gentle heat, and mix it with the Cotton Seed Oil.

286. OLEUM HYOSCYAMI COMPOSITUM.

Compound Oil of Hyoscyamus.

Balsamum Tranquillans.

Oil of Absinth,	
Oil of Lavender,	
Oil of Rosemary,	
Oil of Sage,	
Oil of Thyme, of each, *two drops*	2 Drops.
Infused Oil of Hyoscyamus (F. 279), *one hundred cubic centimeters*	100 Cc.

Mix them.

Note.—Oil of Absinth is the volatile oil of *Artemisia Absinthium* Linné. (Wormwood), and Oil of Sage is the volatile oil of *Salvia officinalis* Linné. Infused Oil of Hyoscyamus is the *Oleum Hyoscyami* of the Germ. Pharm.; see under No. 279. The *Baumé Tranquille* (*Balsamum tranquillans*) of the Codex is a more complex preparation, not identical with the above, but possessing about the same properties.

287. OXYMEL SCILLÆ.

Oxymel of Squill.

Vinegar of Squill (U. S. P.), *fifty grammes*	50 Gm.
Honey, *one hundred grammes*	100 Gm.

Mix them in a tared porcelain capsule or enamelled iron vessel, and apply the heat of a water-bath until the mixture has been reduced to the weight of *one hundred* (100) *grammes*. Then strain, allow it to cool, and transfer it to bottles, which should be well corked.

288. PEPSINUM AROMATICUM.

Aromatic Pepsin.

Saccharated Pepsin (U. S. P.), *ninety-seven grammes*	97 Gm.
Aromatic Fluid Extract (U. S P.), *six cubic centimeters*	6 Cc.
Tartaric Acid, *one and one-half grammes*	1.5 Gm.
Sodium Chloride, *one and one-half grammes*	1.5 Gm

Mix the ingredients by trituration, dry the product by exposure to warm air, and keep it in well-stoppered bottles.

289. PILULÆ.

Pills.

In giving the formulas for Pills, the quantities of the several ingredients required for *one hundred* (100) *pills* are given in Metric Weights in the first column, while the quantities required for each *single pill* are given in Apothecaries' Weight in the second column. When it is desirable to prepare a number of pills by the proportion given for the *single pill*, it is recommended that upon multiplying by the number of pills required, the nearest whole number, or nearest convenient fraction, in each case, be chosen.

290. PILULÆ AD PRANDIUM.

Dinner Pills.

1. When "Dinner Pills," under this or some other equivalent name, are prescribed without further specification, it is recommended that the *Pilulæ Aloes et Mastiches* of the U. S. P., also called Lady Webster's Dinner Pills, be dispensed.

Note.—Of other combinations, bearing similar names, or used for similar purposes, the following appear to be those most commonly in use:

2. Chapman's Dinner Pill.	*One hundred* (100) *pills contain:*	*Each pill contains:*
Purified Aloes (U. S. P)., *nine and seven-tenths grammes*	9.7 Gm.	1½ grains.
Mastic, *nine and seven-tenths grammes*	9.7 Gm.	1½ grains.
Ipecac, in fine powder, *six and one-half grammes*	6.5 Gm.	1 grain.
Oil of Fennel, *one and one-half cubic centimeters*	1.5 Cc.	about ¼ minim.

3. Cole's Dinner Pill.	*One hundred* (100) *pills contain:*	*Each pill contains:*
Purified Aloes (U. S. P.), *seven and eight-tenths grammes*	7.8 Gm.	1⅕ grains.
Mass of Mercury (U. S. P.), *seven and eight-tenths grammes*	7.8 Gm.	1⅕ grains.
Jalap, in fine powder, *seven and eight-tenths grammes*	7.8 Gm.	1⅕ grains.
Antimony and Potassium Tartrate, *thirteen centigrammes*	0.13 Gm.	$\frac{1}{50}$ grain.

4. Hall's Dinner Pill.	*One hundred* (100) *pills contain:*	*Each pill contains:*
Purified Aloes (U. S. P.), *six and one-half grammes*	6.5 Gm.	1 grain.
Extract of Glycyrrhiza, *six and one-half grammes*	6.5 Gm.	1 grain.
Soap, in powder, *six and one-half grammes*	6.5 Gm.	1 grain.
Molasses, *six and one-half grammes*	6.5 Gm.	1 grain.

291. PILULÆ ALOES ET PODOPHYLLI COMPOSITÆ.

Compound Pills of Aloes and Podophyllum.

Janeway's Pills.

	One hundred (100) *pills contain:*	*Each pill contains:*
Purified Aloes (U. S. P.), *six and one-half grammes.*	6.5 Gm.	1 grain.
Resin of Podophyllum (U. S. P.), *three and one-fourth grammes*	3.25 Gm.	½ grain.
Alcoholic Extract of Belladonna Leaves (U. S. P.), *one and six-tenths grammes*	1.6 Gm.	¼ grain.
Extract of Nux Vomica (U. S. P.), *one and six-tenths grammes*	1.6 Gm.	¼ grain.

292. PILULÆ ALOINI COMPOSITÆ.

Compound Pills of Aloin.

	One hundred (100) *pills contain:*	*Each pill contains:*
Aloin, *three and one-fourth grammes*	3.25 Gm.	½ grain.
Resin of Podophyllum (U. S. P.), *eight decigrammes.*	0.8 Gm.	⅛ grain.
Alcoholic Extract of Belladonna Leaves (U. S. P.), *one and six-tenths grammes*	1.6 Gm.	¼ grain.

293. PILULÆ ALOINI, STRYCHNINÆ ET BELLADONNÆ.

Pills of Aloin, Strychnine and Belladonna.

	One hundred (100) *pills contain:*	*Each pill contains:*
Aloin, *one and three-tenths grammes*	1.3 Gm.	⅕ grain.
Strychnine, alkaloid, *five centigrammes*	0.05 Gm.	$\frac{1}{120}$ grain.
Alcoholic Extract of Belladonna Leaves (U. S. P.), *eight decigrammes*	0.8 Gm.	⅛ grain.

Note.—These pills are also prepared with double the amount of Strychnine. It is recommended that the stronger pills be dispensed only when specially demanded.

294. PILULÆ ALOINI, STRYCHNINÆ ET BELLADONNÆ COMPOSITÆ.

Compound Pills of Aloin, Strychnine and Belladonna.

	One hundred (100) *pills contain:*	*Each pill contains:*
Aloin, *one and three-tenths grammes*	1.3 Gm.	⅕ grain.
Strychnine, alkaloid, *five centigrammes*	0.05 Gm.	$\frac{1}{120}$ grain.
Alcoholic Extract of Belladonna Leaves (U. S. P.), *eight decigrammes*	0.8 Gm.	⅛ grain.
Extract of Rhamnus Purshiana, *three and one-fourth grammes*	3.25 Gm.	½ grain.

Note.—If Extract of Rhamnus Purshiana is not available, take Fluid Extract of Rhamnus Purshiana (U. S. P.), and evaporate it, on a water-bath, to a pilular consistence.

These pills are also prepared with double the amount of Strychnine. It is recommended that the stronger pills be dispensed only when specially demanded.

295. PILULÆ ANTIDYSPEPTICÆ.

Antidyspeptic Pills.

	One hundred (100) *pills contain:*	*Each pill contains:*
Strychnine, alkaloid, *sixteen centigrammes*	0.16 Gm.	$\frac{1}{40}$ grain.
Ipecac, in fine powder, *sixty-five centigrammes*	0.65 Gm.	$\frac{1}{10}$ grain.
Alcoholic Extract of Belladonna Leaves (U. S. P.), *sixty-five centigrammes*	0.65 Gm.	$\frac{1}{10}$ grain.
Mass of Mercury (U. S. P.), *thirteen grammes*	13 Gm.	2 grains.
Compound Extract of Colocynth (U. S. P.), *thirteen grammes*	13 Gm.	2 grains.

296. PILULÆ ANTINEURALGICÆ.

Antineuralgic Pills.

1. *Gross' Antineuralgic Pills.*

	One hundred (100) *pills contain:*	*Each pill contains:*
Quinine Sulphate, *thirteen grammes*	13 Gm.	2 grains.
Morphine Sulphate, *thirty-two centigrammes*	0.32 Gm.	$\frac{1}{20}$ grain.
Strychnine, alkaloid, *twenty-two centigrammes*	0.22 Gm.	$\frac{1}{30}$ grain.
Arsenous Acid, *thirty-two centigrammes*	0.32 Gm.	$\frac{1}{20}$ grain.
Extract of Aconite Leaves (U. S. P., 1870), *three and two-tenths grammes*	3.2 Gm.	$\frac{1}{2}$ grain.

Note.—When "Antineuralgic Pills," or "Neuralgia Pills," without other specification, are prescribed, it is recommended that the above preparation be dispensed. Sometimes the Morphine Sulphate is directed to be omitted.

2. *Brown-Séquard's Antineuralgic* (or *Neuralgia*) *Pills* have the following composition:

	One hundred (100) *pills contain:*	*Each pill contains:*
Extract of Hyoscyamus (U. S. P.), *four and one-half grammes*	4.5 Gm.	$\frac{2}{3}$ grain.
Extract of Conium (U. S. P.), *four and one-half grammes*	4.5 Gm.	$\frac{2}{3}$ grain.
Extract of Ignatia (U. S. P.), *three and two-tenths grammes*	3.2 Gm.	$\frac{1}{2}$ grain.
Extract of Opium (U. S. P.), *three and two-tenths grammes*	3.2 Gm.	$\frac{1}{2}$ grain.
Extract of Aconite Leaves (U. S. P., 1870), *two and two-tenths grammes*	2.2 Gm.	$\frac{1}{3}$ grain.
Extract of Indian Cannabis (U. S. P.), *one and six-tenths grammes*	1.6 Gm.	$\frac{1}{4}$ grain.
Extract of Stramonium (U. S. P.), *one and three-tenths grammes*	1.3 Gm.	$\frac{1}{5}$ grain.
Alcoholic Extract of Belladonna Leaves (U. S. P.), *one and one-tenth grammes*	1.1 Gm.	$\frac{1}{6}$ grain.

297. PILULÆ ANTIPERIODICÆ.

Antiperiodic Pills.

Warburg's Pills.

1. *With Aloes:*

	One hundred (100) *pills contain:*	*Each pill contains:*
Extract of Aloes (U. S. P.), *six and one-half grammes.*	6.5 Gm.	1 grain.
Rhubarb, *three and two-tenths grammes*	3.2 Gm.	½ grain.
Angelica, seed, *three and two-tenths grammes*	3.2 Gm.	½ grain.
Elecampane, *one and six-tenths grammes*	1.6 Gm.	¼ grain.
Saffron, *one and six-tenths grammes*	1.6 Gm.	¼ grain.
Fennel, *one and six-tenths grammes*	1.6 Gm.	¼ grain.
Zedoary, root, *eight decigrammes*	0.8 Gm.	⅛ grain.
Cubebs, *eight decigrammes*	0.8 Gm.	⅛ grain.
Myrrh, *eight decigrammes*	0.8 Gm.	⅛ grain.
White Agaric, *eight decigrammes*	0.8 Gm.	⅛ grain.
Camphor, *eight decigrammes*	0.8 Gm.	⅛ grain.
Quinine Sulphate, *nine grammes*	9.0 Gm.	1⅖ grains.
Extract of Gentian (U. S. P.)	a sufficient quantity.	a sufficient quantity.

Reduce the drugs to a fine, uniform powder, and make this into pills, by means of Extract of Gentian, in accordance with the formula above given.

2. *Without Aloes:*

Prepare the pills in the same manner as directed in the previous formula, but omit the Extract of Aloes.

Note.—These pills have been introduced for the purpose of facilitating the administration of Warburg's Tincture in a solid form. When "Warburg's Pills," or "Pills of Warburg's Tincture" are prescribed, without further specification, those containing Aloes should be dispensed. Those without Aloes should be furnished only when they are expressly demanded.

Each Warburg's Pill represents about 1 fluidrachm of Warburg's Tincture, with or without aloes, respectively (see *Tinctura Antiperiodica*, F. 400).

298. PILULÆ COLOCYNTHIDIS COMPOSITÆ.

Compound Pills of Colocynth.

Pilulæ Cocciæ. Cochia Pills.

	One hundred (100) *pills contain:*	*Each pill contains:*
Extract of Colocynth (U. S. P.), *one and one-tenth grammes*	1.1 Gm.	⅙ grain.
Purified Aloes (U. S. P.), *thirteen grammes*	13 Gm.	2 grains.
Resin of Scammony (U. S. P.), *thirteen grammes* .	13 Gm.	2 grains.
Oil of Cloves, *one and one-half cubic centimeters* . .	1.5 Cc.	¼ minim.

Note.—The *Pilula Colocynthidis Composita* of the Brit. Pharm., for which the above is an equivalent, is prepared with Colocynth Pulp, and contains Potassium

Sulphate, which was originally added as an aid to reduce the ingredients to powder. With the use of Extract of Colocynth, this becomes unnecessary.

The Brit. Pharm. directs the above to be kept as a pill-mass, to be made into pills of such weight as may be prescribed. When such specification is omitted, it is recommended to dispense pills containing the quantities above directed.

299. PILULÆ COLOCYNTHIDIS ET HYOSCYAMI.

Pills of Colocynth and Hyoscyamus.

	One hundred (100) *pills contain:*	*Each pill contains:*
Extract of Colocynth (U. S. P.), *sixty-five centigrammes*	0.65 Gm.	$\frac{1}{10}$ grain.
Purified Aloes (U. S. P.), *nine and seven-tenths grammes*	9.7 Gm.	$1\frac{1}{2}$ grains.
Resin of Scammony (U. S. P.), *nine and seven-tenths grammes*	9.7 Gm.	$1\frac{1}{2}$ grains.
Oil of Cloves, *one cubic centimeter*	1 Cc.	$\frac{1}{6}$ minim.
Extract of Hyoscyamus (U. S. P.), *nine and seven-tenths grammes*	9.7 Gm.	$1\frac{1}{2}$ grains.

Note.—The *Pilula Colocynthidis et Hyoscyami* of the Brit. Pharm. is directed to be made by mixing 2 parts of Compound Pill of Colocynth (F. 298), with 1 part of Extract of Hyoscyamus, and is directed to be kept as a pill-mass, to be made into pills of such weight as may be directed. When such specification is omitted, it is recommended to dispense pills containing the quantities above directed.

300. PILULÆ COLOCYNTHIDIS ET PODOPHYLLI.

Pills of Colocynth and Podophyllum.

	One hundred (100) *pills contain:*	*Each pill contains:*
Compound Extract of Colocynth (U. S. P.), *sixteen and two-tenths grammes*	16.2 Gm.	$2\frac{1}{2}$ grains.
Resin of Podophyllum (U. S. P.), *one and six-tenths grammes*	1.6 Gm.	$\frac{1}{4}$ grain.

301. PILULÆ FERRI COMPOSITÆ.

(U. S. P., 1880.)

Compound Pills of Iron.

	One hundred (100) *pills contain:*	*Each pill contains:*
Myrrh, *nine and three-fourths grammes*	9.75 Gm.	$1\frac{1}{2}$ grains.
Sodium Carbonate, *four grammes and eighty-five centigrammes*	4.85 Gm.	$\frac{3}{4}$ grain.
Sulphate of Iron, *four grammes and eighty-five centigrammes*	4.85 Gm.	$\frac{3}{4}$ grain.
Syrup	a sufficient quantity.	

302. PILULÆ CALBANI COMPOSITÆ.

(U. S. P., 1880.)

Compound Pills of Galbanum.

	One hundred (100) *pills contain:*	*Each pill contains:*
Galbanum, *nine and three-fourths grammes*	9.75 Gm.	$1\frac{1}{2}$ grains.
Myrrh, *nine and three-fourths grammes*	9.75 Gm.	$1\frac{1}{2}$ grains.
Asafetida, *three and one-fourth grammes*	3.25 Gm.	$\frac{1}{2}$ grain.
Syrup	a sufficient quantity.	

303. PILULÆ CLONOINI.

Pills of Glonoin.

Pills of Nitroglycerin.

Spirit of Glonoin (U. S. P.), *six and one-half grammes* . . .	6.5 Gm.
Althæa, in fine powder, *six and one-half grammes*	6.5 Gm.
Confection of Rose (U. S. P.)	a sufficient quantity.

Mix the Spirit of Glonoin intimately with the powdered Althæa, expose the mixture for a short time to the air, so that the alcohol may evaporate, then make a pill-mass by means of Confection of Rose, and divide it into *one hundred* (100) *pills*.

Each pill contains $\frac{1}{100}$ *grain of Glonoin* (*Nitroglycerin*).

304. PILULÆ LAXATIVÆ POST PARTUM.

Laxative Pills after Confinement.

Barker's Post Partum Pills.

	One hundred (100) *pills contain:*	*Each pill contains:*
Compound Extract of Colocynth (U. S. P.), *eleven grammes*	11 Gm.	$1\frac{2}{3}$ grains.
Purified Aloes (U. S. P.), *five and one-half grammes.*	5.5 Gm.	$\frac{5}{6}$ grain.
Extract of Nux Vomica (U. S. P.), *two and one-half grammes*	2.5 Gm.	$\frac{5}{12}$ grain.
Resin of Podophyllum (U. S. P.), *one-half gramme.*	0.5 Gm.	$\frac{1}{12}$ grain.
Ipecac, in fine powder, *one-half gramme*	0.5 Gm.	$\frac{1}{12}$ grain.
Extract of Hyoscyamus (U. S. P.), *eight grammes.*	8.0 Gm.	$1\frac{1}{4}$ grain.

Note.—This is the formula generally employed by Dr. Fordyce Barker, except where special circumstances render modifications necessary. The formula usually quoted in manufacturers' lists and some formularies is not correct.

305. PILULÆ METALLORUM.

Metallic Pills.

Pilulæ Metallorum Amaræ. Bitter Metallic Pills.

	One hundred (100) *pills contain:*	*Each pill contains:*
Reduced Iron, *six and one-half grammes*	6.5 Gm.	1 grain.
Quinine Sulphate, *six and one-half grammes*	6.5 Gm.	1 grain.
Strychnine, alkaloid, *thirty-two centigrammes*	0.32 Gm.	$\frac{1}{20}$ grain.
Arsenous Acid, *thirty-two centigrammes*	0.32 Gm.	$\frac{1}{20}$ grain.

Note.—A similar combination is known under the name of *Aitken's Tonic Pills:*

	One hundred (100) *pills contain:*	*Each pill contains:*
Reduced Iron, *four and one-half grammes*	4.5 Gm.	$\frac{2}{3}$ grain.
Quinine Sulphate, *six and one-half grammes*	6.5 Gm.	1 grain.
Strychnine, alkaloid, *thirteen centigrammes*	0.13 Gm.	$\frac{1}{50}$ grain.
Arsenous Acid, *thirteen centigrammes*	0.13 Gm.	$\frac{1}{50}$ grain.

306. PILULÆ OPII ET CAMPHORÆ.

Pills of Opium and Camphor.

	One hundred (100) *pills contain:*	*Each pill contains:*
Powdered Opium, *six and one-half grammes*	6.5 Gm.	1 grain.
Camphor, *thirteen grammes*	13 Gm.	2 grains.

307. PILULÆ OPII ET PLUMBI.

Pills of Opium and Lead.

	One hundred (100) *pills contain:*	*Each pill contains*
Powdered Opium, *six and one-half grammes*	6.5 Gm.	1 grain.
Lead Acetate, *six and one-half grammes*	6.5 Gm.	1 grain.

308. PILULÆ PODOPHYLLI, BELLADONNÆ ET CAPSICI.

Pills of Podophyllum, Belladonna and Capsicum.

Squibb's Podophyllum Pills.

	One hundred (100) *pills contain:*	*Each pill contains:*
Resin of Podophyllum (U. S. P.), *one and six-tenths grammes*	1.6 Gm.	$\frac{1}{4}$ grain.
Alcoholic Extract of Belladonna Leaves (U. S. P.), *eight decigrammes*	0.8 Gm.	$\frac{1}{8}$ grain.
Capsicum, in moderately fine powder, *three and two-tenths grammes*	3.2 Gm.	$\frac{1}{2}$ grain.
Sugar of Milk, in fine powder, *six and one-half grammes*	6.5 Gm.	1 grain.
Acacia, in fine powder, *one and six-tenths grammes*	1.6 Gm.	$\frac{1}{4}$ grain.
Glycerin,		each,
Syrup (U. S. P.), each	a sufficient quantity.	a sufficient quantity.

309. PILULÆ QUADRUPLICES.

Quadruplex Pills.

Quatuor Pills. Pilulæ Ferri et Quininæ Compositæ.

	One hundred (100) *pills contain:*	*Each pill contains:*
Dried Sulphate of Iron, *six and one-half grammes.*	6.5 Gm.	1 grain.
Quinine Sulphate, *six and one-half grammes* . . .	6.5 Gm.	1 grain.
Purified Aloes (U. S. P.), *six and one-half grammes.*	6.5 Gm.	1 grain
Extract of Nux Vomica (U. S. P.), *one and six-tenths grammes*	1.6 Gm.	$\frac{1}{4}$ grain.
Extract of Gentian (U. S. P.)	a sufficient quantity.	a sufficient quantity.

310. PILULÆ TRIPLICES.

Triplex Pills.

Pilula Triplex.

	One hundred (100) *pills contain:*	*Each pill contains:*
1. Purified Aloes (U. S. P.), *thirteen grammes*	13 Gm.	2 grains.
Mass of Mercury (U. S. P.), *six and one-half grammes*	6.5 Gm.	1 grain.
Resin of Podophyllum (U. S. P.), *one and six-tenths grammes*	1.6 Gm.	$\frac{1}{4}$ grain.

Note.—When *Pilula Triplex*, under this name or some equivalent, is prescribed without further specification, it is recommended that the above preparation be dispensed. A formula devised by Dr. John W. Francis is also in use:

2. *Francis' Triplex Pill.*	*One hundred* (100) *pills contain:*	*Each pill contains:*
Purified Aloes (U. S. P.), *five and one-half grammes.*	5.5 Gm.	$\frac{5}{6}$ grain.
Scammony, *five and one-half grammes*	5.5 Gm.	$\frac{5}{6}$ grain.
Mass of Mercury (U. S. P.), *five and one-half grammes*	5.5 Gm.	$\frac{5}{6}$ grain.
Croton Oil, *thirty-two one-hundredths cubic centimeter*	0.32 Cc.	$\frac{1}{20}$ minim.
Oil of Caraway, *one and six-tenths cubic centimeters.*	1.6 Cc.	$\frac{1}{4}$ minim.
Tincture of Aloes and Myrrh (U. S. P.) .	a sufficient quantity.	a sufficient quantity.

311. PULVIS ACACIÆ COMPOSITUS.

Compound Powder of Acacia.

Pulvis Gummosus (Germ. Pharm.)

Acacia, in fine powder, *fifty grammes*	50 Gm.
Glycyrrhiza, in fine powder, *thirty-four grammes*	34 Gm.
Sugar, in fine powder, *sixteen grammes*	16 Gm.

Mix them intimately.

312. PULVIS ACETANILIDI COMPOSITUS.

Compound Powder of Acetanilid.

Acetanilid, *fifty grammes*	50 Gm.
Caffeine, *two grammes*	2 Gm.
Tartaric Acid, *three grammes*	3 Gm.
Sodium Bicarbonate, *forty-five grammes*	45 Gm.

Reduce the ingredients separately to a fine powder and mix them thoroughly.

Note.—This preparation is popularly prescribed in New Orleans, under the name of "Kamna-Fuga," as an antipyretic, and is claimed to have some advantages over acetanilid by itself.

313. PULVIS ALOES ET CANELLÆ.

Powder of Aloes and Canella.

Hiera Picra.

Purified Aloes (U. S. P.), in fine powder, *eighty grammes*	80 Gm.
Canella, in fine powder, *twenty grammes*	20 Gm.

Mix them intimately.

314. PULVIS AMYGDALÆ COMPOSITUS.

Compound Powder of Almond.

Sweet Almond, *sixty grammes*	60 Gm.
Sugar, in fine powder, *thirty grammes*	30 Gm.
Acacia, in fine powder, *ten grammes*	10 Gm.

Blanch the Sweet Almond, then dry them thoroughly with a soft cloth, and rub them lightly in a mortar, until they form a mass of a smooth consistence. Mix the Acacia and Sugar, add them to the mass previously prepared, and rub the whole to a coarse powder, which is to be preserved in a lightly covered jar.

Note.—If 820 grains of this preparation be thoroughly triturated with 17 fluidounces of Water, gradually added, and the mixture finally strained, the product will be about 16 fluidounces of *Mistura Amygdalæ* (U. S. P.).

315. PULVIS ANTICATARRHALIS.

Catarrh Powder.

Catarrh Snuff.

Morphine Hydrochlorate, *forty-one centigrammes*	0.41 Gm.
Acacia, in fine powder, *twenty-five grammes*	25 Gm.
Bismuth Subnitrate, *seventy-five grammes*	75 Gm.

Mix them intimately by trituration.

316. PULVIS CATECHU COMPOSITUS.

Compound Powder of Catechu.

Catechu, in fine powder, *forty grammes*	40 Gm.
Kino, in fine powder, *twenty grammes*	20 Gm.
Krameria, in fine powder, *twenty grammes*	20 Gm.
Cinnamon, in fine powder, *ten grammes*	10 Gm.
Nutmeg, in fine powder, *ten grammes*	10 Gm.

Mix them intimately, pass the powder through a fine sieve, and afterwards rub it lightly in a mortar. Keep it in a stoppered bottle.

Note.—This preparation is official in the Brit. Pharm.

317. PULVIS CRETÆ AROMATICUS.

Aromatic Powder of Chalk.

Cinnamon, *eight grammes*	8 Gm.
Saffron, *six grammes*	6 Gm.
Nutmeg, *six grammes*	6 Gm.
Cloves, *three grammes*	3 Gm.
Cardamom, *two grammes*	2 Gm.
Prepared Chalk, *twenty-three grammes*	23 Gm.
Sugar, *fifty-two grammes*	52 Gm.

Mix the ingredients and reduce them to a fine powder. Pass this through a fine sieve, and afterwards rub it lightly in a mortar. Keep it in a stoppered bottle.

Note.—This preparation is equivalent to the *Pulvis Cretæ Aromaticus* of the Brit. Pharm. This authority adds the following note: "If a product of bright color be desired, the saffron may previously be moistened and triturated with a little water or alcohol, or the fresh and faintly damp mixture may be subjected to considerable pressure in the triturating process."

318. PULVIS CRETÆ AROMATICUS CUM OPIO.

Aromatic Powder of Chalk with Opium.

Aromatic Powder of Chalk (F. 317), *ninety-seven and one-half grammes*	97.5 Gm.
Powdered Opium, *two and one-half grammes*	2.5 Gm.

Mix them intimately.

Every 40 grains of this preparation contain 1 grain of Powdered Opium.

Note.—This preparation is official in the Brit. Pharm.

319. PULVERES EFFERVESCENTES.

Effervescent Powders.

The Effervescent Powders for which formulas are given in the Formulary are most conveniently and efficiently dispensed in the form of

fine powders, because in this condition they can be made extemporaneously and with an assurance of their freshness and efficiency. The popular demand, however, seems to be for Granular Effervescent Powders, the preparation of which requires certain modifications of the formulas, important only in so far as they enable the dispenser to granulate the powder in a convenient and expeditious manner.

General Observations and Directions.

Effervescent Powders are composed of the medicinal agent in admixture with an alkaline bicarbonate, an organic acid, and sugar. The proportion of the medicinal agent is dependent upon its dose, that of the alkaline bicarbonate and of the organic acid is dependent upon their molecular relation to each other; while the proportion of sugar is dependent upon the quantity necessary as a sweetening agent and diluent.

The ingredients for making the *fine pulverent form* of Effervescent Powders are: The Medicinal Agent, Sodium Bicarbonate, Tartaric Acid and Sugar, and it is necessary that these be well dried before mixing them.

To make the *granular form* of Effervescent Powders the ingredients need not be dried, unless specially directed, and the ingredients are the same as for the pulverulent form, with the single *exception that one-half the molecule of Tartaric Acid is replaced by one-half a molecule of Crystallized Citric Acid.*

With the view to simplifying the formulas for Effervescent Powders, three new preparations have been embodied in this Formulary, viz.:

Acidum Citricum Saccharatum (Saccharated Citric Acid), Formula No. 5.

Acidum Tartaricum Saccharatum (Saccharated Tartaric Acid), Formula No. 8.

Sodii Bicarbonas Saccharatus (Saccharated Sodium Bicarbonate), Formula No. 341.

The proportion of Sugar in these new Saccharates is so adjusted that when either of the Acid Saccharates is mixed with an equal weight of the Alkaline Saccharate, the acid and alkali are in molecular relation to each other, and, when dissolved in Water, will form the Neutral Tartrate and Citrate of Sodium respectively.

With these three Saccharates in stock it becomes possible to make Effervescent Powders quickly with any medicinal agent that may be prescribed, while they simplify the formulas for the Effervescent preparations now in the Formulary, their use being exemplified by the following *General Formulas:*

General Formulas.

FORMULA A. *Fine Powder.*

Medicinal Agent, in fine powder, *fifty grammes* . . . . . **50 Gm.**
Saccharated Sodium Bicarbonate (F. 341), *four hundred and seventy-five grammes* . . . . . **475 Gm.**
Saccharated Tartaric Acid (F. 8), *four hundred and seventy-five grammes* . . . . . **475 Gm.**

Triturate the ingredients, *previously well-dried*, until a uniformly mixed powder is obtained.

FORMULA B. *Granular Powder.*

Medicinal Agent, in fine powder, *fifty grammes* . . . . . **50 Gm.**
Saccharated Sodium Bicarbonate (F. 341), *four hundred and seventy-five grammes* . . . . . **475 Gm.**
Saccharated Tartaric Acid (F. 8), *two hundred and thirty-seven and one-half grammes* . . . . . **237.5 Gm.**
Saccharated Citric Acid (F. 5), *two hundred and thirty-seven and one-half grammes* . . . . . **237.5 Gm.**

Mix the ingredients in a mortar, transfer them to an evaporating dish, and heat upon a water-bath, kept at 60°–71° C. (140°–160° F.), under constant stirring with a wooden spatula, until dry and uniformly granular.

The Saccharated Citric Acid, being made from crystallized Citric Acid containing one molecule of Water of Crystallization, supplies the moisture necessary to cause the powder, when heated, to cake and adhere together. If the somewhat pasty mass is then stirred with the spatula, small granules are readily formed, and these become firm when completely dried.

Throughout this process the contact of the powder with metals should be carefully avoided.

Effervescent Powders should be preserved in well-stoppered wide-mouthed vials.

Note.—To make these Effervescent Compounds it is not necessary to have the Saccharated Alkali and Saccharated Acids in stock. The quantities of Sodium Bicarbonate, of Tartaric Acid, of Citric Acid, and of Sugar, required for each formula are readily ascertained by simple calculation, according to the following rule:

Multiply the number of grammes of the Saccharate prescribed by the figures indicating the percentage of alkali or acid it contains, and divide the sum of this by one hundred. The quotient is the quantity of Alkali or Acid, expressed in grammes, and by deducting this quantity from the total quantity of the Saccharate, the quantity of Sugar necessary is ascertained.

Applying this rule, by way of example, to *General Formula B.*, we have the following result:

1. 475 Gm. of Saccharated Sodium Bicarbonate, containing 75 % require 356.25 Gm. of Sodium Bicarbonate and 118.75 Gm. of Sugar.

2. 237.5 Gm. of Saccharated Tartaric Acid, containing 67.5 %, require 160.3 Gm. of Tartaric Acid and 77.2 Gm. of Sugar.

3. 237.5 Gm. of Saccharated Citric Acid, containing 62.5 %, require 148.4 Gm. of Citric Acid and 89.1 Gm. of Sugar.

And the formula would then be:

Medicinal Agent, *fifty grammes*	50 Gm.
Sodium Bicarbonate, *three hundred and fifty-six and one-fourth grammes*	356.25 Gm.
Tartaric Acid, *one hundred and sixty and three-tenths grammes.*	160.3 Gm.
Citric Acid, *one hundred and forty-eight and four-tenths grammes*	148.4 Gm.
Sugar, *two hundred and eighty-five and five one-hundredths grammes*	285.05 Gm.
To make one thousand grammes	1000 Gm.

320. PULVIS FERRI ET QUININÆ CITRATIS EFFERVESCENS.

Effervescent Powder of Citrate of Iron and Quinine.

Effervescent Citrate of Iron and Quinine.

Soluble Citrate of Iron and Quinine (U. S. P.), in very fine powder, *ten grammes*	10 Gm.
Saccharated Sodium Bicarbonate (F. 341), *four hundred and ninety-five grammes*	495 Gm.
Saccharated Tartaric Acid (F. 8), *four hundred and ninety-five grammes*	495 Gm.

Mix the ingredients, previously well dried, and triturate them until a uniform powder is obtained.

To make

Granular Effervescent Citrate of Iron and Quinine,

Substitute Saccharated Citric Acid (F. 5), *not dried, two hundred and forty-seven and one-half* (247.5 Gm.) *grammes* for an equal weight of the Saccharated Tartaric Acid, and prepare the granulated compound as directed under the General Formula (F. 319; B.).

Ninety (90) *grains (or about a heaped teaspoonful) of this preparation represent about one* (1) *grain of Citrate of Iron and Quinine.*

321. PULVIS FERRI PHOSPHATIS EFFERVESCENS.

Effervescent Powder of Phosphate of Iron.

Effervescent Phosphate of Iron.

Phosphate of Iron (U. S. P.), in very fine powder, *twenty-four grammes*	24 Gm.
Saccharated Sodium Bicarbonate (F. 341), *four hundred and eighty-eight grammes*	488 Gm.
Saccharated Tartaric Acid (F. 8), *four hundred and eighty-eight grammes*	488 Gm.

Mix the ingredients, *previously well dried*, and triturate them until a uniform powder is obtained.

To make

Granular Effervescent Phosphate of Iron,

Substitute Saccharated Citric Acid (F. 5), *not dried*, *two hundred and forty-four* (244 Gm.) *grammes* for an equal weight of the Saccharated Tartaric Acid, and prepare the granulated compound as directed under the General Formula (F. 319, B.).

Ninety (90) *grains* (*or about a heaped teaspoonful*) *of this preparation represent about two* (2) *grains of Phosphate of Iron.*

322. PULVIS HYDRARGYRI CHLORIDI MITIS ET JALAPÆ.

Powder of Mild Chloride of Mercury and Jalap.

Calomel and Jalap.

Mild Chloride of Mercury, *thirty-four grammes*	34 Gm.
Jalap, in fine powder, *sixty-six grammes*	66 Gm.

Mix them intimately.

Note.—When "Calomel and Jalap" is prescribed for an adult, without any specification of quantities, it is recommended that about 30 grains be dispensed as one dose.

323. PULVIS IODOFORMI COMPOSITUS.

Compound Powder of Iodoform.

Iodoform and Naphthalin.

Iodoform, in fine powder, *twenty grammes*	20 Gm.
Boric Acid, in fine powder, *thirty grammes*	30 Gm.
Naphthalin, *fifty grammes*	50 Gm.
Oil of Bergamot, *two and one-half cubic centimeters*	2.5 Cc.

Triturate the Naphthalin with the Oil of Bergamot, then mix it with the Iodoform and Boric Acid, and triturate until a homogeneous powder is produced.

Note.—This powder is used in many cases, where a *diluted* preparation of Iodoform, for external purposes, is desired. The odor of the Iodoform is masked both by the Oil of Bergamot, and by the Naphthalin.

324. PULVIS KINO COMPOSITUS.

Compound Powder of Kino.

Kino, in fine powder, *seventy-five grammes*	75 Gm.
Powdered Opium, *five grammes*	5 Gm.
Cinnamon, in fine powder, *twenty grammes*	20 Gm.

Mix them intimately, pass the mixed powder through a moderately fine sieve, and afterwards rub it lightly in a mortar. Keep it in a stoppered bottle.

Every 20 grains of this preparation contain 1 grain of Powdered Opium.

Note.—This preparation is official in the Brit. Pharm.

325. PULVIS MYRICÆ COMPOSITUS.

Compound Powder of Bayberry.

Composition Powder.

Bayberry, bark of the root, *sixty grammes*	60 Gm.
Ginger, *thirty grammes*	30 Gm.
Capsicum, *five grammes*	5 Gm.
Cloves, *five grammes*	5 Gm.

Reduce the substances to a moderately fine powder.

Note.—Bayberry root bark is derived from *Myrica cerifera* Linné (Wax myrtle; Candleberry).

326. PULVIS PANCREATICUS COMPOSITUS.

Compound Pancreatic Powder.

Peptonizing Powder.

Pancreatin (U. S. P.), *twenty grammes*	20 Gm.
Sodium Bicarbonate, *eighty grammes*	80 Gm.

Mix them by trituration.

Note.—If Pancreatin of proper strength is not available, any other commercial preparation of the pancreas, as, for instance, the extract, may be used in place of it, provided it attains the required standard.

Twenty-five (25) *grains* of this powder are sufficient to peptonize 1 pint of fresh cow's milk, by proceeding in the following manner:

Add the Compound Pancreatic Powder to 4 fluidounces of tepid Water, contained in a suitable flask, and afterwards add 1 pint of fresh cow's Milk, previously heated to 38° C. (100.4° F.). Maintain the mixture at this temperature during thirty minutes, then transfer the flask to a cold place.

Milk thus peptonized should not be used when it has been kept over twenty-four hours, or when it has developed a bitter taste.

327. PULVIS PEPSINI COMPOSITUS.

Compound Powder of Pepsin.

Pulvis Digestivus.

Saccharated Pepsin (U. S. P.), *fifteen grammes*	15 Gm.
Pancreatin (U. S. P.), *fifteen grammes*	15 Gm.
Diastase, *one gramme*	1 Gm.
Lactic Acid (U. S. P.), *one cubic centimeter*	1 Cc.
Hydrochloric Acid (U. S. P.), *two cubic centimeters*	2 Cc.
Sugar of Milk, *sixty-six grammes*	66 Gm.

Add the Acids gradually to the Sugar of Milk, and triturate until they are thoroughly mixed. Mix the Pepsin, Pancreatin and Diastase, and then incorporate this mixture, by trituration, with the Sugar of Milk. Finally, rub the mixture through a hair-sieve, and preserve the powder in bottles.

Note.—The best commercial variety of Diastase, capable of converting the largest comparative amount of starch into dextrin and glucose, should be used for this preparation.

328. PULVIS POTASSII BROMIDI EFFERVESCENS.

Effervescent Powder of Potassium Bromide.

Effervescent Potassium Bromide.

Potassium Bromide, in very fine powder, *one hundred and ten grammes* . . . . . 110 Gm.
Saccharated Sodium Bicarbonate (F. 341), *four hundred and forty-five grammes* . . . . . 445 Gm.
Saccharated Tartaric Acid (F. 8), *four hundred and forty-five grammes* . . . . . 445 Gm.

Mix the ingredients, *previously well dried*, and triturate them until a uniform powder is obtained.

To make

Granular Effervescent Potassium Bromide,

Substitute Saccharated Citric Acid (F. 5), *not dried, two hundred and twenty-two and one-half* (222.5 Gm.) *grammes*, for an equal weight of the Saccharated Tartaric Acid, and prepare the granulated compound as directed under the General Formula (F. 319, B.).

Ninety (90) *grains* (*or about a heaped teaspoonful*) *of this preparation represent about ten* (10) *grains of Potassium Bromide.*

329. PULVIS POTASSII BROMIDI EFFERVESCENS CUM CAFFEINA.

Effervescent Powder of Potassium Bromide with Caffeine.

Effervescent Potassium Bromide with Caffeine.

Potassium Bromide, in very fine powder, *one hundred and ten grammes* . . . . . 110 Gm.
Caffeine, in very fine powder, *eleven grammes* . . . . . 11 Gm.
Saccharated Sodium Bicarbonate (F. 341), *four hundred and forty grammes* . . . . . 440 Gm.
Saccharated Tartaric Acid (F. 8), *four hundred and forty grammes* . . . . . 440 Gm.

Mix the ingredients, *previously well dried*, and triturate them until a uniform powder is obtained.

To make

Granular Effervescent Potassium Bromide with Caffeine,

Substitute Saccharated Citric Acid (F. 5), *not dried, two hundred and twenty* (220 Gm.) *grammes*, for an equal weight of the Saccharated Tartaric Acid, and prepare the granulated compound as directed under the General Formula (F. 319, B.).

Ninety (90) *grains* (*or about a heaped teaspoonful*) *of this preparation represent about ten* (10) *grains of Potassium Bromide and one* (1) *grain of Caffeine.*

330. PULVIS RHEI ET MAGNESIÆ ANISATUS.

Anisated Powder of Rhubarb and Magnesia.

Compound Anise Powder.

Rhubarb, in fine powder, *thirty-five grammes*	35 Gm.
Heavy Magnesia, calcined, *sixty-five grammes*	65 Gm.
Oil of Anise, *eight cubic centimeters*	8 Cc.
Alcohol, *ten cubic centimeters*	10 Cc.

Mix the powders, add the Oil of Anise previously dissolved in the Alcohol, and triturate until a uniform mixture results.

331. PULVIS SALIS CAROLINI FACTITII EFFERVESCENS.

Effervescent Powder of Artificial Carlsbad Salt.

Effervescent Artificial Carlsbad Salt.

Artificial Carlsbad Salt (F. 336), in form of dry powder, *one hundred and eighty grammes*	180 Gm.
Saccharated Sodium Bicarbonate (F. 341), *four hundred and ten grammes*	410 Gm.
Saccharated Tartaric Acid (F. 8), *four hundred and ten grammes*	410 Gm.

Mix the ingredients, *previously well dried*, and triturate them until a uniform powder is obtained.

To make

Granular Effervescent Artificial Carlsbad Salt,

Substitute Saccharated Citric Acid (F. 5), *not dried, two hundred and five* (205 Gm.) *grammes*, for an equal weight of the Saccharated Tartaric Acid, and prepare the granulated compound as directed under the General Formula (F. 319, B.).

A solution of about eighty-seven (87) *grains of this preparation, in six* (6) *fluidounces of Water, represents an equal volume of Carlsbad Water (Sprudel), in its essential constituents.*

332. PULVIS SALIS KISSINGENSIS FACTITII EFFERVESCENS.

Effervescent Powder of Artificial Kissingen Salt.

Effervescent Artificial Kissingen Salt.

Artificial Kissingen Salt (F. 337), *two hundred and eighty grammes*	280 Gm.
Saccharated Sodium Bicarbonate (F. 341), *three hundred and sixty grammes*	360 Gm.
Saccharated Tartaric Acid (F. 8), *three hundred and sixty grammes*	360 Gm.

Mix the ingredients, *previously well dried*, and triturate them until a uniform powder is obtained.

To make

Granular Effervescent Artificial Kissingen Salt,

Substitute Saccharated Citric Acid (F. 5), *not dried, one hundred and eighty* (180 Gm.) *grammes*, for an equal weight of the Saccharated Tartaric Acid, and prepare the granulated compound as directed under the General Formula (F. 319, B.).

A solution of about eighty (80) *grains of this preparation in six* (6) *fluidounces of Water, represents an equal volume of Kissingen Water* (*Rackoczi Springs*) *in its essential constituents.*

333. PULVIS SALIS VICHYANI FACTITII EFFERVESCENS.

Effervescent Powder of Artificial Vichy Salt.

Effervescent Artificial Vichy Salt.

Artificial Vichy Salt (F. 338), *two hundred and forty grammes.*	240 Gm.
Saccharated Sodium Bicarbonate (F. 341), *three hundred and eighty grammes*	380 Gm.
Saccharated Tartaric Acid (F. 8), *three hundred and eighty grammes*	380 Gm.

Mix the ingredients, *previously well dried*, and triturate them until a uniform powder is obtained.

To make

Granular Effervescent Artificial Vichy Salt,

Substitute Saccharated Citric Acid (F. 5), *not dried, one hundred and ninety* (190 Gm.) *grammes*, for an equal weight of the Saccharated Tartaric Acid, and prepare the granulated compound as directed under the General Formula (F. 319, B.).

A solution of about fifty-seven (57) *grains of this preparation, in six* (6) *fluidounces of Water, represents an equal volume of Vichy Water* (*Grande Grille Spring*), *in its essential constituents.*

334. PULVIS SALIS VICHYANI FACTITII EFFERVESCENS CUM LITHIO.

Effervescent Powder of Artificial Vichy Salt with Lithium.

Effervescent Artificial Vichy Salt with Lithium.

Artificial Vichy Salt (F. 338), *one hundred and fifty-six grammes*	156 Gm.
Lithium Citrate, in very fine powder, *fifty-six grammes*	56 Gm.
Saccharated Sodium Bicarbonate (F. 341), *three hundred and ninety-four grammes*	394 Gm.
Saccharated Tartaric Acid (F. 8), *three hundred and ninety-four grammes*	394 Gm.

Mix the ingredients, *previously well dried*, and triturate them until a uniform powder is obtained.

To make

Granular Effervescent Artificial Vichy Salt with Lithium,

Substitute Saccharated Citric Acid (F. 5), *not dried, one hundred and ninety-two* (192) *grammes*, for an equal weight of the Saccharated Tartaric Acid, and prepare the granulated compound as directed under the General Formula (F. 319, B.).

Ninety (90) *grains (or about a heaped teaspoonful) of this preparation represent fourteen* (14) *grains of Artificial Vichy Salt and five* (5) *grains of Lithium Citrate.*

335. PULVIS TALCI SALICYLICUS.

Salicylated Powder of Talcum.

Salicylic Acid, *thirty grammes*	30 Gm.
Boric Acid, in fine powder, *one hundred grammes*	100 Gm.
Talcum, in fine powder, *eight hundred and seventy grammes* . .	870 Gm.

Mix them intimately.

Note.—The corresponding preparation of the Germ. Pharm. has the title *Pulvis Salicylicus cum Talco*, and contains 10 parts of Wheat Starch in place of Boric Acid.

336. SAL CAROLINUM FACTITIUM.

Artificial Carlsbad Salt.

I. *In a dry, amorphous form* (Germ. Pharm.).

Potassium Sulphate, *twenty grammes*	20 Gm.
Sodium Chloride, *one hundred and eighty grammes*	180 Gm.
Sodium Bicarbonate, *three hundred and sixty grammes* . . .	360 Gm.
Sodium Sulphate, dried, *four hundred and forty grammes* . .	440 Gm.

Triturate the ingredients, previously well dried, to a fine, uniform powder.

Note.—The dried Sodium Sulphate is prepared by slowly drying the crystalline salt until it has lost one-half of its weight.

II. *In a crystalline form.*

Potassium Sulphate, *twenty grammes*	20 Gm.
Sodium Chloride, *one hundred and eighty grammes*	180 Gm.
Sodium Carbonate, in clear crystals, *six hundred and ten grammes*	610 Gm.
Sodium Sulphate, crystallized, *eight hundred and eighty grammes*	880 Gm.
Distilled Water, *five hundred grammes*	500 Gm.

Dissolve the Potassium Sulphate and Sodium Chloride in the Distilled Water, and add this solution to the other two salts, previously melted in a tared capsule and at a gentle heat in their own water of crystallization. Evaporate the mixture to about *eighteen hundred* (1800) *grammes* set it aside in a cool place, and stir frequently, so as

to prevent the formation of large crystals, taking care, however, that none of the salt separate in a pulverulent form. Distribute any remaining water of crystallization uniformly over the crystals, and dry the whole mixture sufficiently by exposure to air, so that it will retain its crystalline character.

A solution of about 16 grains of the dry, or about 27 grains of the crystalline salt, in 6 fluidounces of water, represents an equal volume of Carlsbad Water (Sprudel) in its essential constituents.

Note.—The salts employed in the preparation of the crystalline form must have been purified by recrystallization.

337. SAL KISSINGENSE FACTITIUM.

Artificial Kissingen Salt.

Potassium Chloride, *seventeen grammes*	17 Gm.
Sodium Chloride, *three hundred and fifty-seven grammes* . . .	357 Gm.
Magnesium Sulphate, anhydrous, *fifty-nine grammes*	59 Gm.
Sodium Bicarbonate, *one hundred and seven grammes*	107 Gm.

Triturate the ingredients, previously well dried, to a fine, uniform powder.

A solution of about 24 grains of this preparation, in 6 fluidounces of water, represents an equal volume of Kissingen Water (Rakoczi Spring) in its essential constituents.

338. SAL VICHYANUM FACTITIUM.

Artificial Vichy Salt.

Sodium Bicarbonate, *eight hundred and forty-six grammes* .	846 Gm.
Potassium Carbonate, *thirty-eight and one-half grammes* . .	38.5 Gm.
Magnesium Sulphate, anhydrous, *thirty-eight and one half grammes*	38.5 Gm.
Sodium Chloride, *seventy-seven grammes*	77 Gm.

Triturate the ingredients, previously well dried, to a fine, uniform powder.

A solution of about 14 grains of this preparation, in 6 fluidounces of water, represents an equal volume of Vichy Water (Grande Grille Spring) in its essential constituents.

339. SODA CUM CALCE.

Soda with Lime.

London Paste.

Soda,
Lime, each . . . . . equal parts.

Reduce them to powder in a clean iron mortar, previously warmed, and mix them intimately. Keep the powder in small, well-stoppered vials.

340. SODII BORO-BENZOAS.

Sodium Boro-Benzoate.

Sodium Borate, in fine powder	3 parts.
Sodium Benzoate	4 parts.

Mix them intimately.

341. SODII BICARBONAS SACCHARATUS.

Saccharated Sodium Bicarbonate.

Sodium Bicarbonate (U. S. P.), in very fine powder, *seven hundred and fifty grammes*	750 Gm.
Sugar, in very fine powder, *two hundred and fifty grammes*	250 Gm.

Triturate the powders together until intimately mixed, and preserve the product in well-stoppered bottles.

Note.—This Saccharate, when dissolved in water with an equal weight of Saccharated Citric Acid (F. 5), or of Saccharated Tartaric Acid (F. 8), will form a neutral solution, and it is introduced into the Formulary for the convenient preparation of Effervescent Powders (F. 319).

This Saccharate contains 75 % of Sodium Bicarbonate.

342. SPECIES EMOLLIENTES.

Emollient Species.

Emollient Cataplasm. (Germ. Pharm.).

Althæa Leaves,	
Mallow Leaves,	
Melilot Tops,	
Matricaria,	
Flaxseed, of each	equal parts.

Reduce them to a coarse powder, and mix it uniformly.

Note.—Mallow Leaves are derived from *Malva vulgaris* Fries and *Malva sylvestris* Linné. Melilot Tops are the leaves and flowering branches of *Melilotus officinalis* Desrousseaux, and *Melilotus altissimus* Thuilliers.

343. SPECIES LAXANTES.

Laxative Species.

St. Germain Tea. (Germ. Pharm.).

Senna, cut	16 parts.
Elder Flowers	10 parts.
Fennel, bruised	5 parts.
Anise, bruised	5 parts.
Potassium Bitartrate, in fine powder	4 parts.

Moisten the Senna with a small quantity of water; then sprinkle over it, as uniformly as possible, the Potassium Bitartrate. When it has become dry, mix it lightly and uniformly with the other ingredients.

344. SPECIES PECTORALES.

Pectoral Species.

Species ad Infusum Pectorale. Breast Tea. (Germ. Pharm.).

Althæa, peeled	8 parts.
Coltsfoot Leaves	4 parts.
Glycyrrhiza, Russian, peeled	3 parts.
Anise	2 parts.
Mullein Flowers	2 parts.
Orris Root	1 part.

Cut, bruise and mix them.

Note.—Coltsfoot Leaves are derived from *Tussilago Farfara* Linné. Mullein Flowers are from *Verbascum Thapsus* G. Meyer.

Infusum pectorale (Pectoral Infusion, or Infusion of Pectoral Species) is made by infusing 1 troy ounce of the above preparation, in the usual manner, so as to obtain 10 fluidounces of strained product.

345. SPIRITUS ACIDI FORMICI.

Spirit of Formic Acid.

Spiritus Formicarum (Germ. Pharm.). *Spirit of Ants.*

Formic Acid, *thirty-five cubic centimeters*	35 Cc.
Distilled Water, *two hundred and twenty-five cubic centimeters.*	225 Cc.
Alcohol, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Formic Acid with the Distilled Water, and add enough Alcohol to make *one thousand* (1000) *cubic centimeters.*

Note.—Formic Acid is required by the Germ. Pharm. to have a specific gravity of 1.060 to 1.063.

346. SPIRITUS AROMATICUS.

Aromatic Spirit.

Compound Spirit of Orange (U. S. P.), *sixty-five cubic centimeters*	65 Cc.
Deodorized Alcohol, *nine hundred and thirty-five cubic centimeters*	935 Cc.

Mix them. Preserve the product, if it is to be kept in stock, in completely filled and well-stoppered vials or bottles, and stored in a cool and dark place.

Aromatic Spirit may also be prepared in the following manner:

Sweet Orange Peel, fresh, and deprived of the white, inner portion, *six hundred and seventy-five grammes*	675 Gm.
Lemon Peel, fresh, *eighty-five grammes*	85 Gm.
Coriander, bruised, *eighty-five grammes*	85 Gm.
Oil of Staranise, *one and one-half cubic centimeters*	1.5 Cc.
Deodorized Alcohol, a sufficient quantity	
To make five thousand cubic centimeters	5000 Cc.

Macerate the solids during four days with *forty-five hundred* (4500) *cubic centimeters* of Deodorized Alcohol; then add the Oil of Staranise, filter, and pass enough Deodorized Alcohol through the filter to make the product measure *five thousand* (5000) *cubic centimeters.*

Note.—When good, fresh essential oils cannot be readily obtained for preparing the Compound Spirit of Orange, the second formula may be used. But the product obtained by it should not be employed in mixtures containing *iron*, as the latter would cause a darkening of the mixture.

347. SPIRITUS CARDAMOMI COMPOSITUS.

Compound Spirit of Cardamom.

Oil of Cardamom, *two cubic centimeters*	2	Cc.
Oil of Caraway, *three-fourths of a cubic centimeter*	0.75	Cc.
Oil of Cinnamon, Cassia, *one-half cubic centimeter*	0.50	Cc.
Alcohol, *five hundred cubic centimeters*	500	Cc.
Glycerin, *sixty-five cubic centimeters*	65	Cc.
Water, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Oils in the Alcohol, add the Glycerin, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters.*

Note.—This preparation is intended as a flavoring ingredient, being equivalent to the official *Tinctura Cardamomi Composita*, without the coloring matter.

348. SPIRITUS CURASSAO.

Spirit of Curaçao.

Oil of Curaçao Orange, *one hundred and sixty-five cubic centimeters*	165	Cc.
Oil of Fennel, *three cubic centimeters*	3	Cc.
Oil of Bitter Almond, *three-fourths of a cubic centimeter*	0.75	Cc.
Deodorized Alcohol, *eight hundred and thirty-two cubic centimeters*	832	Cc.

Mix the Oils with the Deodorized Alcohol, and keep the Spirit in completely filled and well-corked bottles, and stored in a cool and dark place.

Note.—The essential oils used in this case must be as fresh as possible, and *absolutely free* from any terebinthinate odor or taste. Oil of Curaçao Orange may be obtained without difficulty in the market, but it should be carefully examined as to its quality, immediately upon receipt, and should not be kept in stock, for any length of time, without special precautions. A still finer quality of Oil of Orange is that derived from Citrus nobilis, which is known in the market as Oil of Mandarin.

349. SPIRITUS ODORATUS.

(U. S. P., 1880.)

Perfumed Spirit.

Cologne Water.

Oil of Bergamot, *fifteen cubic centimeters*	15 Cc.
Oil of Lemon, *eight cubic centimeters*	8 Cc.
Oil of Rosemary, *seven cubic centimeters*	7 Cc.
Oil of Lavender Flowers, *four cubic centimeters*	4 Cc.
Oil of Orange Flowers, *four cubic centimeters*	4 Cc.
Acetic Ether, *two cubic centimeters*	2 Cc.
Water, *one hundred and twenty cubic centimeters*	120 Cc.
Alcohol, *eight hundred and forty cubic centimeters*	840 Cc.

Dissolve the Oils and the Acetic Ether in the Alcohol, and add the Water. Set the Mixture aside, in a well-closed bottle, for eight days, then filter through paper, in a well-covered funnel.

350. SPIRITUS OLEI VOLATILIS.

Spirit of a Volatile Oil.

Any Spirit or alcoholic Solution of a Volatile Oil, for which no formula is given by the U. S. Pharm. or by this Formulary, should be prepared in accordance with the following general formula:

Any Volatile Oil, *sixty-five cubic centimeters*	65 Cc.
Deodorized Alcohol, *nine hundred and thirty-five cubic centimeters*	935 Cc.

Dissolve the Volatile Oil in the Deodorized Alcohol.

Note.—The strength of the Spirit thus prepared is approximately 5 per cent. by weight, provided the specific gravity of the Oil is in the neighborhood of 0.900.

351. SPIRITUS OPHTHALMICUS.

Ophthalmic Spirit.

Alcoholic Eye-Wash.

Oil of Lavender, *two cubic centimeters*	2 Cc.
Oil of Rosemary, *six cubic centimeters*	6 Cc.
Alcohol, *ninety-two cubic centimeters*	92 Cc.

Mix them by agitation, and, if necessary, filter the liquid through paper.

352. SPIRITUS SAPONATUS.

Spirit of Soap.

Castile Soap, in shavings, *one hundred and seventy-five grammes.*	175 Gm.
Alcohol, *six hundred cubic centimeters*	600 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Introduce the Soap into a bottle, add the Alcohol and *two hundred* (200) *cubic centimeters* of Water, cork the bottle, and immerse it in hot

Water, frequently shaking. When the Soap is dissolved, allow the bottle and contents to become cold, then add enough Water to make *one thousand* (1000) *cubic centimeters*, and filter.

Note.—The *Spiritus Saponatus* of the Germ. Pharm. is prepared by saponifying Olive Oil with Potassa, and then adding Alcohol and Water.

If time permits, the Spirit ought to be set aside, in a moderately cold place, for about twelve hours, before it is filtered.

353. SPIRITUS SINAPIS

Spirit of Mustard.

Volatile Oil of Mustard, *two grammes*	**2 Gm.**
Alcohol, *one hundred grammes*	**100 Gm.**

Mix them.

Note.—This preparation is official in the Germ. Pharm.

354. SPONCIA COMPRESSA.

Compressed Sponge.

Sponge Tent.

Sponge	**a sufficient quantity.**
Mucilage of Acacia (U. S. P.)	**1 volume.**
Water	**9 volumes.**

Mix a sufficient quantity of Mucilage of Acacia and of Water, in the proportion of *one* (1) *volume* of the former to *nine* (9) *volumes* of the latter, and immerse in the liquid the Sponge, previously freed from sand and other obvious impurities, and cut into suitable pieces. When the Sponge has been thoroughly impregnated, firmly wrap twine around it so as to bring it to the desired shape, and then dry it.

Note.—Sponge thus prepared is best preserved with the twine wrapped around it. If the twine is removed, special care must be taken to protect the Sponge against damp air.

355. SPONCIA DECOLORATA.

Decolorized Sponge.

Bleached Sponge.

Sponge,
Potassium Permanganate,
Sodium Hyposulphite,
Hydrochloric Acid,
Water, each **a sufficient quantity.**

Free the Sponge from sand and any other obvious impurities or damaged portions by beating, washing and trimming, then soak it for about fifteen minutes in a sufficient quantity of Solution of Potassium Permanganate, containing *fifteen* (15) *grammes* to the *liter*, wringing the Sponge out occasionally and replacing it in the liquid. Then remove it and wash it with Water, until the latter runs off colorless.

Wring out the Water, and then place the Sponge into a Solution of Sodium Hyposulphite, containing *sixty* (60) *grammes* to the *liter*. Next add for every *liter* of the last-named solution used, *sixty* (60) *cubic centimeters* of Hydrochloric Acid diluted with *two hundred and fifty* (250) *cubic centimeters* of Water. Macerate the Sponge in the liquid for about fifteen minutes, expressing it frequently and replacing it in the liquid. Then remove it, wash it thoroughly with Water, and dry it. In the case of large and dark-colored sponges, this treatment may be repeated until the color has been removed as far as possible.

Note.—If it is desired to keep the Sponge soft, and to prevent it from shrinking when dry, it may be dipped, after having been finally washed, into a mixture of 1 volume of Glycerin and 5 volumes of Water, after which it is to be wrung out and allowed to dry.

356. SUCCUS LIMONIS CUM PEPSINO.

Lime Juice and Pepsin.

Pepsin (U. S. P.), *thirty-five grammes*	35 Gm.
Water, *one hundred and seventy-five cubic centimeters*	175 Cc.
Glycerin, *one hundred and seventy-five cubic centimeters*	175 Cc.
Alcohol, *ninety cubic centimeters*	90 Cc.
Purified Talcum (F. 395), *fifteen grammes*	15 Gm.
Lime Juice, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Pepsin in the Water, mixed with about *five hundred cubic centimeters* of Lime Juice. Then add the Glycerin and Alcohol, and lastly, enough Lime Juice to make *one thousand* (1000) *cubic centimeters*. Incorporate the Purified Talcum with the liquid, let it stand a few days in a cold place, if convenient, occasionally agitating, then filter it through a wetted filter, and finally pass enough Lime Juice through the filter to restore the original volume.

Each fluidrachm represents 2 grains of Pepsin (U. S. P.).

357. SYRUPUS ACTÆÆ COMPOSITUS.

Compound Syrup of Actæa.

Compound Syrup of Cimicifuga (or *Black Cohosh*).

Fluid Extract of Cimicifuga (U. S. P.), *forty cubic centimeters.*	40 Cc.
Fluid Extract of Glycyrrhiza (U. S. P.), *twenty cubic centimeters*	20 Cc.
Fluid Extract of Senega (U. S. P.), *twenty cubic centimeters*	20 Cc.
Fluid Extract of Ipecac (U. S P.), *ten cubic centimeters*	10 Cc.
Wild Cherry, in moderately fine powder, *forty grammes*	40 Gm.
Purified Talcum (F. 395), *fifteen grammes*	15 Gm.
Sugar, *six hundred and fifty grammes*	650 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Wild Cherry with *three hundred and fifty* (350) *cubic centimeters* of Water, and allow it to macerate during one hour. Then add to it the Fluid Extracts and the Talcum, and stir or agitate the mixture frequently and thoroughly during about fifteen minutes. Transfer it to a wetted filter, and, when the liquid ceases to drop from the funnel, wash the contents of the filter with Water to obtain *five hundred* (500) *cubic centimeters* of filtrate. In this dissolve the Sugar by agitation, and add enough Water, previously passed through the filter, to make *one thousand* (1000) *cubic centimeters*.

358. SYRUPUS ASARI COMPOSITUS.

Compound Syrup of Asarum.

Compound Syrup of Canada Snake-Root.

Asarum, root, in moderately coarse (No. 40) powder, *sixty grammes*	60	Gm.
Alcohol, *one hundred and eighty-five cubic centimeters*	185	Cc.
Cochineal, in fine powder, *one and one-half grammes*	1.5	Gm.
Potassium Carbonate, *two and one-half grammes*	2.5	Gm.
Wine of Ipecac (U. S. P.), *thirty cubic centimeters*	30	Cc.
Sugar, *seven hundred grammes*	700	Gm.
Water, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Mix the Asarum intimately with the Cochineal and Potassium Carbonate, previously triturated together. Moisten the powder with a sufficient quantity of a menstruum prepared by mixing the Alcohol with *three hundred and fifty* (350) *cubic centimeters* of Water, and allow it to macerate, in a covered vessel, for twenty-four hours. Then transfer it to a small percolator, and pour on the remainder of the menstruum. Allow the percolation to proceed slowly, and then follow up the menstruum by Water, until *five hundred* (500) *cubic centimeters* of percolate are obtained. To this add the Wine of Ipecac, and afterwards the Sugar, and dissolve the latter by agitation. Finally, add enough Water, previously passed through the percolator, to make *one thousand* (1000) *cubic centimeters*.

Each fluidrachm represents about 3½ grains of Asarum.

359. SYRUPUS CALCII CHLORHYDROPHOSPHATIS.

Syrup of Calcium Chlorhydrophosphate.

Syrup of Chlorhydrophosphate of Lime.

Precipitated Calcium Phosphate, *seventeen and one-half grammes*	17.5	Gm.
Spirit of Lemon (U. S. P.), *twenty cubic centimeters*	20	Cc.
Hydrochloric Acid (U. S. P.),		
Water,		
Syrup (U. S. P.), of each, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Triturate the Precipitated Calcium Phosphate with *thirty* (30) *cubic centimeters* of Water, and dissolve it with the aid of Hydrochloric Acid, avoiding an excess. Then add the Spirit of Lemon, filter the liquid, and wash the filter with a mixture of *thirty* (30) *cubic centimeters*, each, of Water and of Syrup. Lastly, add enough Syrup to the filtrate, to make *one thousand* (1000) *cubic centimeters*.

Each fluidrachm contains 1 grain of Calcium Phosphate.

360. SYRUPUS CALCII ET SODII HYPOPHOSPHITUM.

Syrup of Calcium and Sodium Hypophosphites.

Syrup of Hypophosphite of Lime and Soda.

Calcium Hypophosphite, *thirty-five grammes*	35	Gm.
Sodium Hypophosphite, *thirty-five grammes*	35	Gm.
Citric Acid, *one and one-half grammes*	1.5	Gm.
Sugar, *seven hundred and seventy-five grammes*	775	Gm.
Water, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the two Hypophosphites and the Citric Acid in *five hundred* (500) *cubic centimeters* of Water, filter the solution, add the Sugar to the filtrate, and pass enough Water through the filter to make the product, after the Sugar has been dissolved by agitation, measure *one thousand* (1000) *cubic centimeters*.

Each fluidrachm contains 2 grains, each, of Calcium Hypophosphite and Sodium Hypophosphite.

361. SYRUPUS CALCII HYPOPHOSPHITIS.

Syrup of Calcium Hypophosphite.

Syrup of Hypophosphite of Lime.

Calcium Hypophosphite, *thirty-five grammes*	35	Gm.
Citric Acid, *one and one-half grammes*	1.5	Gm.
Sugar, *seven hundred and seventy-five grammes*	775	Gm.
Water, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Calcium Hypophosphite and the Citric Acid in *five hundred* (500) *cubic centimeters* of Water, filter the solution, add the Sugar to the filtrate, and pass enough Water through the filter to make the product, after the Sugar has been dissolved by agitation, measure *one thousand* (1000) *cubic centimeters*.

Each fluidrachm contains 2 grains of Calcium Hypophosphite.

362. SYRUPUS CALCII IODIDI.

Syrup of Calcium Iodide.

Iodine, *seventy-six grammes*	76 Gm.
Iron Wire, fine, bright, and finely cut, *twenty-eight grammes*	28 Gm.
Precipitated Calcium Carbonate, *thirty-four grammes*	34 Gm.
Sugar, *seven hundred grammes*	700 Gm.
Distilled Water,	
Syrup (U. S. P.), of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Iron Wire with *fifty-seven* (57) *grammes* of the Iodine and *one hundred and eighty-five* (185) *cubic centimeters* of Distilled Water, and apply a gentle heat, until the Iodine is combined, and the liquid has acquired a greenish color. Filter the liquid through a small filter into a flask containing the remainder of the Iodine, wash the filter with *sixty* (60) *cubic centimeters* of Distilled Water, and heat the solution gently, taking care that no iodine is lost by evaporation. Heat *two hundred and fifty* (250) *cubic centimeters* of Distilled Water in a capacious capsule to boiling, and add to it small alternate portions, first of the Precipitated Calcium Carbonate, and then of the solution of Iodide of Iron, in small portions at a time, stirring briskly and waiting until the violence of the reaction moderates before adding a fresh portion. From time to time, add a little Distilled Water, to replace that lost by evaporation. When all the Iron solution has been added, continue heating the mixture until it is quietly boiling, then filter it through a wetted filter, and wash the latter with enough Distilled Water to make the product, when cold, measure *five hundred* (500) *cubic centimeters.* In this dissolve the Sugar by agitation, then make up the volume with Syrup to *one thousand* (1000) *cubic centimeters*, and strain, if necessary.

Each fluidrachm contains about 5 grains of Calcium Iodide.

363. SYRUPUS CALCII LACTOPHOSPHATIS CUM FERRO.

Syrup of Calcium Lactophosphate with Iron.

Syrup of Lactophosphate of Lime with Iron.

Lactate of Iron, *eight and one-half grammes*	8.5 Gm.
Potassium Citrate, *eight and one-half grammes*	8.5 Gm.
Water, *sixty cubic centimeters*	60 Cc.
Syrup of Calcium Lactophosphate (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Lactate of Iron and Potassium Citrate in the Water with the aid of heat, and add enough Syrup of Calcium Lactophosphate to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm contains ½ grain of Lactate of Iron and about ¼ grain of Calcium Lactate (or about ⅜ grain of so-called Calcium Lactophosphate).

364. SYRUPUS CHONDRI COMPOSITUS.

Compound Syrup of Chondrus.

Compound Syrup of Irish Moss.

Irish Moss, *one gramme*	1 Gm.
Fluid Extract of Ipecac (U. S. P.), *one cubic centimeter*	1 Cc.
Fluid Extract of Squill (U. S. P.), *sixteen cubic centimeters*	16 Cc.
Fluid Extract of Senega (U. S. P.), *sixteen cubic centimeters*	16 Cc.
Camphorated Tincture of Opium (U. S. P.), *twenty-eight cubic centimeters*	28 Cc.
Purified Talcum (F. 395), *fifteen grammes*	15 Gm.
Sugar, *six hundred and fifty grammes*	650 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Macerate the Irish Moss in *sixty* (60) *cubic centimeters* of Water until it is softened, then heat it on a boiling water-bath for fifteen minutes, strain it through flannel, without pressure, and wash the flannel and contents with *sixty* (60) *cubic centimeters* of hot Water. Mix the Fluid Extracts and Tincture with the Purified Talcum and *three hundred and twenty-five* (325) *cubic centimeters* of Water, shake the mixture frequently and thoroughly during half an hour, and then filter it through a wetted filter, returning the first portions of the filtrate until it runs through clear. Mix the mucilage of Irish Moss with the filtrate, then add the Sugar, and pass enough Water through the filter to make the product, after the Sugar has been dissolved by agitation, measure *one thousand* (1000) *cubic centimeters.*

365. SYRUPUS CINNAMOMI.

Syrup of Cinnamon.

Cinnamon (Cassia), in moderately coarse powder, *one hundred grammes*	100 Gm.
Alcohol, *fifty cubic centimeters*	50 Cc.
Sugar, *seven hundred grammes*	700 Gm.
Cinnamon Water (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Alcohol with *four hundred and fifty* (450) *cubic centimeters* of Cinnamon Water, moisten the Cinnamon with a sufficient quantity of this menstruum and allow it to macerate for about two hours. Then transfer it to a small percolator, and percolate, in the usual manner, using first the remainder of the menstruum above directed, and afterwards, Cinnamon Water. Collect the first *five hundred* (500) *cubic centimeters* of the percolate separately, and dissolve in it the Sugar. Then collect an additional quantity of percolate and add it to the Syrup, so as to make *one thousand* (1000) *cubic centimeters.*

Note.—This preparation is practically identical with that official in the Germ. Pharm.

366. SYRUPUS CODEINÆ.

Syrup of Codeine.

Codeine Sulphate, *one gramme*	1 Gm.
Syrup (U. S. P.), *one hundred cubic centimeters*	100 Cc.

Reduce the Codeine Sulphate to a fine powder and dissolve it in the Syrup previously warmed.

A fluidrachm of this preparation contains about one-half (½) grain of Codeine Sulphate.

Note.—The *Syrupus Codeini* of the French Pharmacopœia is a weaker preparation, containing only about ⅛ grain of Codeine (alkaloid) in a fluidrachm.

367. SYRUPUS COFFEÆ.

Syrup of Coffee.

Coffee, roasted, *two hundred and fifty grammes*	250 Gm.
Sugar, *seven hundred and fifty grammes*	750 Gm.
Water	a sufficient quantity.

Introduce the Coffee, reduced to a moderately coarse powder, into a suitable vessel; pour upon it *five hundred* (500) *cubic centimeters* of boiling Water, then cover it well, and boil for five minutes. Allow it to become cold, keeping the vessel well covered; strain off the liquid and pass enough Water through the strainer to make the strained liquid, when cold, measure *five hundred* (500) *cubic centimeters*. In this dissolve the Sugar, by agitation, without heat, and strain through muslin.

Note.—It is recommended that a mixture of equal parts of the commercial varieties of Coffee, known as "Java" and "Mocha," be employed for this purpose. The coffee may also be exhausted by percolation, but special arrangements are then necessary to maintain the menstruum at the proper temperature.

368. SYRUPUS ERIODICTYI AROMATICUS.

Aromatic Syrup of Eriodictyon.

Aromatic Syrup of Yerba Santa. Syrupus Corrigens.

Fluid Extract of Eriodictyon (U. S. P.), *thirty-two cubic centimeters*	32 Cc.
Solution of Potassa (U. S. P.), *twenty-five cubic centimeters*	25 Cc.
Compound Tincture of Cardamom (U. S. P.), *sixty-five cubic centimeters*	65 Cc.
Oil of Sassafras, *one-half cubic centimeter*	0.5 Cc.
Oil of Lemon, *one-half cubic centimeter*	0.5 Cc.
Oil of Cloves, *one cubic centimeter*	1 Cc.
Alcohol, *thirty-two cubic centimeters*	32 Cc.
Sugar, *eight hundred grammes*	800 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Fluid Extract of Eriodictyon and Solution of Potassa, then add *one hundred* (100) *cubic centimeters* of Water previously mixed with the Compound Tincture of Cardamom, and afterwards add the Oils dissolved in the Alcohol. Shake the mixture thoroughly, then filter it, and pour enough Water through the filter to obtain *three hundred and seventy-five* (375) *cubic centimeters* of filtrate. Pour this upon the Sugar contained in a bottle, and dissolve it by placing the bottle in hot water, frequently agitating. Lastly, cool the product and add enough Water, passed through the filter previously used, to make *one thousand* (1000) *cubic centimeters*.

Note.—This preparation is chiefly intended as a vehicle, for disguising the taste of quinine or of other bitter substances. (Compare F. 60.)

369. SYRUPUS FERRI ARSENATIS.

Syrup of Arsenate of Iron.

Sodium Arsenate (U. S. P.), dried to a constant weight at a heat not exceeding 149° C. (300° F.), *forty centigrammes* . .	0.40 Gm.
Citrate of Iron (U. S. P.), *thirty-five centigrammes*	0.35 Gm.
Water, *thirty cubic centimeters*	30 Cc.
Syrup (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Sodium Arsenate and Citrate of Iron in the Water, contained in a test-tube, by the aid of heat. Then mix the solution with enough Syrup to make *one thousand* (1000) *cubic centimeters*.

Each fluidrachm contains about $\frac{1}{60}$ *grain of Arsenate of Iron* (*ferric*).

Note.—Care should be taken to select perfectly formed crystals of Sodium Arsenate, which must then be dried completely at 100° C. (212° F.), and the quantity required for the above formula must be weighed from the *dried* salt. It is advisable to dry a fresh quantity of the salt each time the above Syrup is to be prepared.

370. SYRUPUS FERRI BROMIDI.

(U. S. P., 1880.)

Syrup of Bromide of Iron.

A syrupy liquid containing 10 per cent. of Ferrous Bromide ($FeBr_2$, 215.4).

Iron, in the form of fine wire, and cut into small pieces, *thirty grammes*	30 Gm.
Bromine, *seventy-five grammes*	75 Gm.
Sugar, in coarse powder, *six hundred grammes*	600 Gm.
Distilled Water, a sufficient quantity	
To make one thousand grammes	1000 Gm.

Introduce the Iron into a flask of thin glass of suitable capacity, add to it *two hundred* (200) *grammes* of Distilled Water and afterwards

the Bromine. Shake the mixture occasionally, until the reaction ceases and the solution has acquired a green color and has lost the odor of Bromine. Place the Sugar in a porcelain capsule and filter the Solution of Bromide of Iron into the Sugar. Rinse the flask and Iron wire with *ninety* (90) *grammes* of Distilled Water and pass the washings through the filter into the Sugar. Stir the mixture with a porcelain or wooden spatula, heat it to the boiling point on a sand-bath, and, having strained the Syrup through linen into a tared bottle, add enough Distilled Water to make the product weigh *one thousand* (1000) *grammes*. Lastly, shake the bottle and transfer its contents to small vials, which should be completely filled, securely corked, and kept in a place accessible to daylight.

371. SYRUPUS FERRI CITRO-IODIDI.

Syrup of Citro-Iodide of Iron.

Tasteless Syrup of Iodide of Iron.

Iodine, *fifty-nine grammes*	59	Gm.
Iron Wire, fine, bright, and finely cut, *twenty-eight and one-half grammes*	28.5	Gm.
Potassium Citrate, *eighty-eight grammes*	88	Gm.
Sugar, *six hundred and fifty grammes*	650	Gm.
Distilled Water, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Mix the Iron with *one hundred and fifty* (150) *cubic centimeters* of Distilled Water in a flask, add *forty-five* (45) *grammes* of the Iodine, apply a gentle heat and set aside until the Iodine is combined and the solution has acquired a green color. Then heat the contents of the flask to boiling, filter the liquid, and wash the filter with *thirty* (30) *cubic centimeters* of warm Distilled Water. Add to the filtrate the remaining *fourteen* (14) *grammes* of Iodine, and, as soon as solution has been effected, mix with the Potassium Citrate previously dissolved in *one hundred* (100) *cubic centimeters* of Distilled Water, and agitate the liquid until it has assumed a green color. Pour this upon the Sugar contained in a bottle, agitate until solution has been effected, and when the liquid is cold, add enough Distilled Water to make *one thousand* (1000) *cubic centimeters*.

Each fluidrachm contains an amount of Iron, corresponding to about 3.6 grains of Ferric Iodide.

Note.—The official *Syrupus Ferri Iodidi* contains about 8 grains of *ferrous iodide* (protiodide of iron) in each fluidrachm. The above preparation contains the iron in the *ferric* condition.

372. SYRUPUS FERRI ET MANGANI IODIDI.

Syrup of Iodide of Iron and Manganese.

Iodine, *eighty-one and one-half grammes*	81.5 Gm.
Iron Wire, fine, bright, and finely cut, *twenty-six and one-half grammes*	26.5 Gm.
Manganese Sulphate, *twenty-six and one-half grammes*	26.5 Gm.
Potassium Iodide, *thirty-one and one-half grammes*	31.5 Gm.
Sugar, *seven hundred and seventy-five grammes*	775 Gm.
Distilled Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Iron with *two hundred and fifty* (250) *cubic centimeters* of Distilled Water in a flask, add the Iodine, and prepare a solution of ferrous iodide, in the usual manner, aiding the process, if necessary, by heating the contents of the flask, at first gently, and finally to boiling. Filter the liquid, through a small filter, directly upon the Sugar, contained in a suitable bottle. Dissolve the Manganese Sulphate in *one hundred and twenty-five* (125) *cubic centimeters* of Distilled Water, and the Potassium Iodide in *one hundred and twenty-five* (125) *cubic centimeters* of Diluted Alcohol, mix the two solutions, and filter into the same bottle which contains the Sugar and the Iron solution. Wash the filter with *thirty* (30) *cubic centimeters* of cold Distilled Water, receiving the washings in the same bottle. Agitate until the Sugar is dissolved, and, if necessary, strain. Finally, make up the volume with Distilled Water to *one thousand* (1000) *cubic centimeters.*

Each fluidrachm contains about 6 grains of Iodide of Iron (ferrous) and 3 grains of Manganese Iodide.

373. SYRUPUS FERRI HYPOPHOSPHITIS.

Syrup of Hypophosphite of Iron.

Hypophosphite of Iron, *seventeen and one-half grammes*	17.5 Gm.
Potassium Citrate, *twenty-five grammes*	25 Gm.
Orange Flower Water, *sixty-five cubic centimeters*	65 Cc.
Syrup (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Hypophosphite of Iron, with the aid of the Potassium Citrate, in the Orange Flower Water, and add enough Syrup to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm contains 1 grain of Hypophosphite of Iron (ferric).

374. SYRUPUS FERRI LACTOPHOSPHATIS.

Syrup of Lactophosphate of Iron.

Lactate of Iron, *seventeen and one-half grammes*	17.5 Gm.
Phosphoric Acid (85 %, U. S. P.)	a sufficient quantity.
Water, *thirty cubic centimeters*	30 Cc.
Syrup (U. S. P.)., a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Lactate of Iron in the Water with the aid of a sufficient quantity of Phosphoric Acid, avoiding an excess, and add enough Syrup to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm contains 1 grain of Lactate of Iron, or about 1½ grains of so-called Lactophosphate of Iron.

375. SYRUPUS FERRI PROTOCHLORIDI.

Syrup of Protochloride of Iron.

Syrup of Ferrous Chloride.

Solution of Protochloride of Iron (F. 222), *fifty cubic centimeters*	50 Cc.
Glycerin, *one hundred and twenty-five cubic centimeters*	125 Cc.
Orange Flower Water, *one hundred and twenty-five cubic centimeters*	125 Cc.
Syrup (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Solution of Protochloride of Iron with the Glycerin and Orange Flower Water, and add enough Syrup to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm contains about 1 grain of Protochloride of Iron (ferrous chloride).

376. SYRUPUS FERRI SACCHARATI SOLUBILIS.

Syrup of Soluble Saccharated Iron.

Syrupus Ferri Oxydati Solubilis (Germ. Pharm.). *Syrup of Saccharated Oxide of Iron. Syrup of Soluble Oxide of Iron.*

1. **Solution of Chloride of Iron** (U. S. P.), *eighty grammes*	80	Gm.
Soda (U. S. P.), *thirty-two and one-half grammes*	32.5	Gm.
Solution of Soda (U. S. P.), a sufficient quantity.		
Sugar, *three hundred grammes*	300	Gm.
Distilled Water,		
Syrup (U. S. P.), of each, a sufficient quantity		
To make one thousand grammes	1000	Gm.

Dissolve the Soda in *two hundred and ten* (210) *cubic centimeters* of Water; add this solution to the Solution of Chloride of Iron previously mixed with *seventy* (70) *grammes* of Syrup, and set the mixture aside, during twenty-four hours, in a dark place. Then pour the clear liquid slowly into *sixteen hundred* (1600) *cubic centimeters* of boiling Distilled Water, continue the boiling for a few minutes, and then set the mixture aside during one day, in a dark place, so that it may become clear

by settling. Withdraw the supernatant liquid by means of a siphon, then wash the residue again with *sixteen hundred* (1600) *cubic centimeters* of boiling Distilled Water, by decantation. Transfer the magma to a wetted strainer, and wash it with hot Distilled Water, until this runs off colorless, but so that the mass on the strainer still retains a moderately strong alkaline reaction. Then allow the excess of liquid to drain off, transfer the moist magma to a tared porcelain capsule, add the Sugar, and heat it on a water-bath, with exclusion of daylight, during two hours, replacing from time to time any Water lost by evaporation, and adding, if necessary, Solution of Soda, drop by drop, until the magma is entirely dissolved. Lastly, add enough Syrup to make the product weigh *one thousand* (1000) *grammes*, and transfer the product to bottles, which should be completely filled, and stored in a cool and dark place.

One hundred grains, or about 75 minims, of this Syrup represent approximately 1 grain of metallic Iron.

Note.—The above process is based upon that of the Germ. Pharm. (1st edition). The formula given by the second edition of this work presupposes the keeping in stock of a dry "Ferrum Oxydatum Saccharatum Solubile" (Saccharated Oxide of Iron), representing 3 per cent. of metallic iron. When this is available, the *Syrup of Soluble Saccharated Iron* may also be prepared by the following formula:

2. **Saccharated Oxide of Iron,**
Syrup,
Water, each . . . . . **equal parts.**

Dissolve the Saccharated Oxide of Iron in the mixed liquids.

377. SYRUPUS GLYCYRRHIZÆ.

Syrup of Glycyrrhiza.

Syrup of Liquorice.

Pure Extract of Glycyrrhiza (U. S. P.), *one hundred and twenty-five grammes*	**125 Gm.**
Glycerin, *one hundred and twenty-five grammes*	**125 Gm.**
Sugar, *six hundred and fifty grammes*	**650 Gm.**
Water, a sufficient quantity	
To make one thousand cubic centimeters	**1000 Cc.**

Dissolve the Pure Extract of Glycyrrhiza in *five hundred* (500) *cubic centimeters* of Water, add the Sugar, dissolve it by agitation, and strain. Then add the Glycerin, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents about 30 grains of Glycyrrhiza.

378. SYRUPUS HYPOPHOSPHITUM COMPOSITUS.

Compound Syrup of Hypophosphites.

Compound Hypophosphites.

Calcium Hypophosphite, *thirty-five grammes*	35	Gm.
Potassium Hypophosphite, *seventeen and one-half grammes*	17.5	Gm.
Sodium Hypophosphite, *seventeen and one-half grammes*	17.5	Gm.
Hypophosphite of Iron, *two and one-fourth grammes*	2.25	Gm.
Manganese Hypophosphite, *two and one-fourth grammes*	2.25	Gm.
Potassium Citrate, *five grammes*	5	Gm.
Citric Acid, *two grammes*	2	Gm.
Quinine Hydrochlorate, *one and one-eighth grammes*	1.125	Gm.
Tincture of Nux Vomica (U. S. P.), *twenty-two cubic centimeters*	22	Cc.
Sugar, *seven hundred and seventy-five grammes*	775	Gm.
Water, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Rub the Hypophosphites of Iron and of Manganese with the Potassium Citrate and Citric Acid to powder, add *sixty* (60) *cubic centimeters* of Water, and warm the mixture a few minutes until a clear greenish solution is obtained. Introduce the other Hypophosphites and the Quinine Hydrochlorate, previously triturated together, into a graduated bottle, next add the Sugar, the Iron and Manganese solution first prepared, the Tincture of Nux Vomica, and lastly, enough Water to make up the volume, as soon as the Sugar is saturated by the liquid, to *one thousand* (1000) *cubic centimeters*. Agitate, until solution has been effected, and strain, if necessary.

Each fluidrachm contains 2 grains of Calcium Hypophosphite, 1 grain, each, of Potassium and Sodium Hypophosphites, ⅛ grain, each, of the Hypophosphites of Iron and of Manganese, $\frac{1}{16}$ grain of Quinine Hydrochlorate, and 1¼ minims of Tincture of Nux Vomica.

Note.—This Syrup should not be confounded with the official *Syrupus Hypophosphitum* (Syrup of the Hypophosphites). It is not intended to be perfectly clear, and should be shaken before using.

379. SYRUPUS IPECACUANHÆ ET OPII.

Syrup of Ipecac and Opium.

Syrup of Dover's Powder.

Fluid Extract of Ipecac (U. S. P.), *eight and one-half cubic centimeters*	8.5	Cc.
Tincture of Deodorized Opium (U. S. P.), *eighty-five cubic centimeters*	85	Cc.
Sugar, *seven hundred and seventy-five grammes*	775	Gm.
Cinnamon Water (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Mix the Fluid Extract and Tincture with *three hundred and fifty* (350) *cubic centimeters* of Cinnamon Water, and filter the liquid; to this add the Sugar, and enough Cinnamon Water to make the product, after the Sugar has been dissolved by agitation, measure *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents 5 grains of Dover's Powder, or ½ grain, each, of Ipecac and Opium.

Note.—In place of the above directed quantities of Fluid Extract of Ipecac and Tincture of Deodorized Opium, *eighty-five* (85) *cubic centimeters* of the official *Tinctura Ipecacuanhæ et Opii* may be taken.

380. SYRUPUS MANNÆ.

Syrup of Manna.

Manna, in flakes, *one hundred and twenty-five grammes*	125 Gm.
Sugar, *seven hundred and seventy-five grammes*	775 Gm.
Alcohol, *sixty-five cubic centimeters*	65 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Manna in *four hundred and fifty* (450) *cubic centimeters* of hot Water, add the Alcohol, set the liquid aside for twelve hours in a moderately warm place, and filter. Dissolve the Sugar in the filtrate, with the aid of a gentle heat, allow the Syrup to cool, and add enough Water, passed through the filter previously used, to make *one thousand* (1000) *cubic centimeters.*

Note.—The product is approximately of the same strength as that which is official in the Germ. Pharm.

381. SYRUPUS MORPHINÆ COMPOSITUS.

Compound Syrup of Morphine.

Fluid Extract of Ipecac (U. S. P.), *two cubic centimeters*	2	Cc.
Fluid Extract of Senega (U. S. P.), *one hundred cubic centimeters*	100	Cc.
Fluid Extract of Rhubarb (U. S. P.), *sixteen cubic centimeters.*	16	Cc.
Morphine Sulphate, *fifty-five centigrammes*	0.55	Gm.
Oil of Sassafras, *one cubic centimeter*	1	Cc.
Syrup (U. S. P.), a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Morphine Sulphate in about *sixty* (60) *cubic centimeters* of Syrup, then add the Fluid Extracts and the Oil of Sassafras, and lastly, enough Syrup to make *one thousand* (1000) *cubic centimeters.* Mix the whole thoroughly by shaking.

Note.—In some sections of the country, this preparation is dispensed, when Pectoral Syrup or Jackson's Cough Syrup is demanded or ordered. As the for-

mula differs too much from that originally used by Dr. Jackson (see Note to F. 384), it is recommended that the above preparation be dispensed only when it is designated by the title above given.

382. SYRUPUS MORPHINÆ SULPHATIS.

Syrup of Morphine Sulphate.

Syrupus Morphinæ. Syrup of Morphine.

1. **Morphine Sulphate**, *two and two-tenths grammes*	2.2 Gm.
Water, hot, *thirty cubic centimeters*	30 Cc.
Syrup (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Morphine Sulphate in the hot Water, and add enough Syrup to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm contains ⅛ grain of Morphine Sulphate.

Note.—This preparation is in considerable use in the Southern States. It should, however, never be dispensed in prescriptions, unless it is known to be the preparation intended, or unless it is designated as that of the National Formulary (N. F.).

When *Syrup of Morphine* is prescribed without any such specific designation or knowledge, it is recommended that the corresponding, but weaker preparation of the French Pharm. be dispensed. The official title of this is *Sirop de Chlorhydrate de Morphine* (or *Sirop de Morphine*).

This may be prepared approximately of the strength required by the Codex, as follows:

2. **Morphine Hydrochlorate**, *seven decigrammes*	0.7 Gm.
Water, *thirty cubic centimeters*	30 Cc.
Syrup (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Morphine Hydrochlorate in the Water, and add enough Syrup to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm contains about $\frac{1}{25}$ grain of Morphine Hydrochlorate.

383. SYRUPUS PAPAVERIS.

Syrup of Poppy.

1. **Tincture of Poppy** (F. 416), *eight hundred and seventy-five cubic centimeters*	875 Cc.
Sugar, *seven hundred and seventy-five grammes*	775 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Evaporate the Tincture of Poppy, on a water-bath, at a gentle heat, until its volume is reduced to *four hundred and fifty* (450) *cubic centimeters.* In this dissolve the Sugar with a gentle heat, strain, and when the Syrup is cold, add enough Water to make *one thousand* (1000) *cubic centimeters.*

Note.—The product is practically identical with the *Syrupus Papaveris* of the Brit. Pharm. The corresponding preparation of the Germ. Pharm. (*Syrupus Papaveris*, or *Syrupus Diacodii*) is much weaker, and may be prepared as follows:

2. Tincture of Poppy (F. 416), *one hundred and twenty-five cubic centimeters* . . . . . 125 Cc.
Syrup (U. S. P.), *eight hundred and seventy-five cubic centimeters.* 875 Cc.

Mix them.

384. SYRUPUS PECTORALIS.

Pectoral Syrup.

Jackson's Pectoral (or *Cough*) *Syrup.*

Morphine Hydrochlorate, *fifty-five centigrammes*	0.55 Gm.
Oil of Sassafras, *one-half cubic centimeter*	0.5 Cc.
Syrup of Acacia (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Morphine Hydrochlorate in about *sixty* (60) *cubic centimeters* of the Syrup, add the Oil of Sassafras, and enough Syrup to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm contains $\frac{1}{32}$ *grain of Morphine Hydrochlorate.*

Note.—The original formula of Dr. Samuel Jackson's Cough Syrup was as follows: Sassafras Pith, 60 grains; Acacia, 1 ounce; Sugar, 28 av. ounces; Muriate of Morphine, 8 grains; Water, enough to make 32 fluidounces. The Sassafras Pith was afterwards uniformly replaced by Oil of Sassafras, and the other constituents of the Syrup have been more or less altered, so that a number of different formulas are in vogue in different sections of the country. It is recommended that the above be followed, if possible, for the sake of uniformity. (See Note to F. 381).

385. SYRUPUS PHOSPHATUM COMPOSITUS.

Compound Syrup of the Phosphates.

Chemical Food.

Precipitated Calcium Carbonate, *thirty-five grammes* . . .	35 Gm.
Soluble Ferric Phosphate (U. S. P.), *seventeen and one-half grammes*	17.5 Gm.
Ammonium Phosphate, *seventeen and one-half grammes* . .	17.5 Gm.
Potassium Bicarbonate, *four grammes*	4 Gm.
Sodium Bicarbonate, *four grammes*	4 Gm.
Citric Acid, *sixty grammes*	60 Gm.
Glycerin, *sixty-five cubic centimeters*	65 Cc.
Phosphoric Acid (50 %), *one hundred and twenty-five cubic centimeters*	125 Cc.
Orange Flower Water, *one hundred and twenty-five cubic centimeters*	125 Cc.
Tincture of Cudbear (F. 418), *sixteen cubic centimeters* . .	16 Cc.
Sugar, *five hundred and twenty-five grammes*	525 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Precipitated Calcium Carbonate with the Potassium and Sodium Bicarbonates, the Citric Acid, Glycerin, and Orange Flower Water, and gradually add the Phosphoric Acid, stirring until solution has been effected. Dissolve the Ferric Phosphate and the Ammonium Phosphate in *two hundred and fifty* (250) *cubic centimeters* of hot Water, cool, and add the solution to that previously prepared. Filter the whole through a pellet of absorbent cotton placed in the neck of a funnel, and receive the filtrate in a graduated bottle containing the Sugar. Agitate until the latter is dissolved, then add the Tincture of Cudbear, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters*.

Each fluidrachm contains about 2 grains of Calcium Phosphate, 1 grain, each, of the Phosphates of Iron and of Ammonium, and smaller quantities of Potassium and Sodium Phosphates.

Note.—Phosphoric Acid (50·%) may be made by adding *seventy* (70) *grammes* of Distilled Water to *one hundred* (100) *grammes* of Phosphoric Acid (U. S. P.), which contains 85 %, by weight, of absolute Orthophosphoric Acid (H_3PO_4).

386. SYRUPUS PINI STROBI COMPOSITUS.

Compound Syrup of White Pine.

White Pine Bark (Pinus Strobus), *seventy-five grammes* . . .	75	Gm.
Wild Cherry Bark, *seventy-five grammes*	75	Gm.
Spikenard Root, *ten grammes*	10	Gm.
Balm of Gilead Buds, *ten grammes*	10	Gm.
Sanguinaria Root, *eight grammes*	8	Gm.
Sassafras Bark, *seven grammes*	7	Gm.
Morphine Sulphate, *one-half gramme*	0.5	Gm.
Chloroform, *six cubic centimeters*	6	Cc.
Sugar, *seven hundred and fifty grammes*	750	Gm.
Alcohol,		
Water,		
Syrup (U. S. P.), of each, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Reduce the vegetable drugs to a moderately coarse (No. 40) powder, moisten the powder with a menstruum composed of 1 volume of Alcohol and 3 volumes of Water, and macerate for 12 hours. Then percolate with the same menstruum until *five hundred* (500) *cubic centimeters* of tincture have been obtained, in which dissolve the Sugar and the Morphine Sulphate; lastly, add the Chloroform, and sufficient Syrup to make *one thousand* (1000) *cubic centimeters*, and strain.

387. SYRUPUS RHAMNI CATHARTICÆ.

Syrup of Rhamnus Cathartica.

Syrup of Buckthorn Berries. Syrupus Spinæ Cervinæ.

Sugar, *eight hundred grammes*	800 Gm.
Fermented Juice of Buckthorn Berries, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Sugar in *four hundred and fifty* (450) *cubic centimeters* of the Juice, with the aid of a gentle heat, allow the Syrup to cool, then add enough of the Juice to make *one thousand* (1000) *cubic centimeters*, and strain, if necessary.

Note.—This preparation is practically identical with that official in the *Germ. Pharm.* The species of Buckthorn to be used is the *Rhamnus cathartica* Linné, native of Europe, and naturalized, to some extent, in the U. S. If the fresh berries cannot be obtained, the imported fermented juice may be used in preparing the Syrup.

388. SYRUPUS RHEI ET POTASSII COMPOSITUS.

Compound Syrup of Rhubarb and Potassa.

Neutralizing Cordial.

Fluid Extract of Rhubarb (U. S. P.), *seventeen and one-half cubic centimeters*	17.5 Cc.
Fluid Extract of Hydrastis (U. S. P.), *eight and one-half cubic centimeters*	8.5 Cc.
Potassium Carbonate, *seventeen and one-half grammes*	17.5 Gm.
Tincture of Cinnamon (U. S. P.), *sixty-five cubic centimeters*	65 Cc.
Spirit of Peppermint (U. S. P.), *eight cubic centimeters*	8 Cc.
Syrup (U. S. P.), *two hundred and fifty cubic centimeters*	250 Cc.
Diluted Alcohol (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Potassium Carbonate in the Syrup, and add the solution to the Fluid Extracts, Tincture and Spirit, previously mixed with *six hundred* (600) *cubic centimeters* of Diluted Alcohol. Mix well, add enough Diluted Alcohol to make *one thousand* (1000) *cubic centimeters*, and filter, if necessary.

389. SYRUPUS RUBI AROMATICUS.

Aromatic Syrup of Blackberry.

Rubus (U. S. P.), *one hundred and twenty-five grammes*	125 Gm.
Cinnamon, *fifteen grammes*	15 Gm.
Nutmeg, *fifteen grammes*	15 Gm.
Cloves, *eight grammes*	8 Gm.
Allspice, *eight grammes*	8 Gm.
Sugar, *six hundred and fifty grammes*	650 Gm.
Diluted Alcohol (U. S. P.), **Blackberry Juice**, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Reduce the Rubus (Blackberry Root) and the Aromatics to a moderately coarse (No. 40) powder, and percolate it, in the usual manner, with the Diluted Alcohol, until *two hundred and fifty* (250) *cubic centi-*

meters of percolate are obtained. To this add *four hundred and fifty* (450) *cubic centimeters* of Blackberry Juice, and dissolve the Sugar in the liquid by agitation. Lastly, add enough Blackberry Juice to make *one thousand* (1000) *cubic centimeters.*

390. SYRUPUS SANGUINARIÆ.

Syrup of Sanguinaria.

Syrup of Bloodroot.

Sanguinaria, in No. 20 powder, *two hundred and twenty-five grammes*	225 Gm.
Acetic Acid (U. S. P.), *one hundred and twenty-five cubic centimeters*	125 Cc.
Sugar, *eight hundred grammes*	800 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Acetic Acid with *three hundred and seventy-five* (375) *cubic centimeters* of Water, moisten the Sanguinaria with a sufficient quantity of this menstruum, and allow it to macerate for two hours. Then pack it in a glass percolator, and percolate in the usual manner, first with the remainder of the menstruum previously prepared, and afterwards with Water, until *seven hundred and fifty* (750) *cubic centimeters* of percolate are obtained, or until the Sanguinaria is practically exhausted. Evaporate the percolate, at a moderate heat, to *four hundred and fifty* (450) *cubic centimeters.* In this dissolve the Sugar with a gentle heat, if necessary, and add enough Water to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents about 13 grains of Sanguinaria.

391. SYRUPUS SENNÆ AROMATICUS.

Aromatic Syrup of Senna.

Senna, *one hundred and twenty-five grammes*	125 Gm.
Jalap, *fifty grammes*	50 Gm.
Rhubarb, *seventeen and one-half grammes*	17.5 Gm.
Cinnamon, *four grammes*	4 Gm.
Cloves, *four grammes*	4 Gm.
Nutmeg, *two grammes*	2 Gm.
Oil of Lemon, *one and one-half cubic centimeters*	1.5 Cc.
Sugar, *seven hundred and fifty grammes*	750 Gm.
Diluted Alcohol (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Reduce the drugs to a moderately fine (No. 50) powder, add to it the Oil of Lemon, and percolate it, in the usual manner, with Diluted

Alcohol. Remove the first *five hundred* (500) *cubic centimeters* of the percolate, and dissolve in this the Sugar, with the aid of a gentle heat, if necessary, but avoiding loss of alcohol by evaporation. Allow the solution to cool, collect a further portion of percolate, and add it to the Syrup, so as to make *one thousand* (1000) *cubic centimeters*.

Each fluidrachm represents 7½ grains of Senna, 3 grains of Jalap, and 1 grain of Rhubarb, with aromatics.

392. SYRUPUS SENNÆ COMPOSITUS.

Compound Syrup of Senna.

Fluid Extract of Senna (U. S. P.), *one hundred and thirty-five cubic centimeters*	135 Cc.
Fluid Extract of Rhubarb (U. S. P.), *thirty-five cubic centimeters*	35 Cc.
Fluid Extract of Frangula (U. S. P.), *thirty-five cubic centimeters*	35 Cc.
Oil of Gaultheria, *four cubic centimeters*	4 Cc.
Alcohol, *sixty cubic centimeters*	60 Cc.
Syrup (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Oil of Gaultheria in the Alcohol, and add this to the mixed Fluid Extracts. Then add enough Syrup to make *one thousand* (1000) *cubic centimeters*, and mix by agitation.

Each fluidrachm represents 8 grains of Senna, 2 grains of Rhubarb, and 2 grains of Frangula.

393. SYRUPUS SODII HYPOPHOSPHITIS.

Syrup of Sodium Hypophosphite.

Sodium Hypophosphite, *thirty-five grammes*	35 Gm.
Citric Acid, *one and one-half grammes*	1.5 Gm.
Sugar, *seven hundred and seventy-five grammes*	775 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Sodium Hypophosphite and the Citric Acid in *five hundred* (500) *cubic centimeters* of Water, and filter the solution. In this dissolve the Sugar by agitation, and pass enough Water through the filter, to make the product measure *one thousand* (1000) *cubic centimeters*.

Each fluidrachm contains 2 grains of Sodium Hypophosphite.

394. SYRUPUS STILLINGIÆ COMPOSITUS.

Compound Syrup of Stillingia.

Compound Fluid Extract of Stillingia (F. 176), *two hundred and fifty cubic centimeters*	250 Cc.
Purified Talcum (F. 395), *fifteen grammes*	15 Gm.
Sugar, *seven hundred grammes*	700 Gm.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Compound Fluid Extract of Stillingia with the Purified Talcum, and afterwards with *two hundred and seventy-five* (275) *cubic centimeters* of Water, and shake them together thoroughly. Then pour the mixture upon a wetted filter, add the Sugar to the filtrate, and pass enough Water through the filter to make the product, after the Sugar has been dissolved by agitation, measure *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents 15 minims of Compound Fluid Extract of Stillingia (*see F. 176*).

395. TALCUM PURIFICATUM.

Purified Talcum.

Talcum, in fine powder	100 parts.
Hydrochloric Acid	15 parts.
Water	a sufficient quantity.

Mix *five hundred* (500) *parts* of boiling Water with the Talcum, gradually add *ten* (10) *parts* of the Hydrochloric Acid, and boil the mixture during fifteen minutes. Then allow the suspended Talcum to subside, pour off the supernatant liquid, and boil the residue again with *five hundred* (500) *parts* of Water mixed with the remainder of the Hydrochloric Acid. Again allow the mixture to become clear by settling, pour off the supernatant liquid, and wash the residue with Water, by repeated decantation, until a portion of the wash-water, filtered and placed in a test-tube, ceases to produce a precipitate with test-solution of silver nitrate acidified with nitric acid. Then transfer the magma to a close linen or muslin strainer, allow it to drain, and dry it by heat.

Note.—Purified Talcum is used as an aid in filtering turbid liquids containing finely-divided matters in suspension, which are apt to pass through the filter, or to stop up its pores.

396. TINCTURÆ.

Tinctures.

General Process.—All Tinctures, for which no working formula is provided by the U. S. Pharmacopœia, the National Formulary, or

some other work of authority, and the strength of which is not otherwise specified by the prescriber, should be prepared in the following proportions:

The Drug, properly comminuted, *one hundred and twenty-five grammes* . . . . . 125 Gm.
The Menstruum, enough to make *one thousand cubic centimeters* . . . . . 1000 Cc.

Note.—The choice of the menstruum will depend upon the nature of the drug, and in some cases upon the uses to which the Tincture is to be applied. In general, it may be stated that, if the useful constituents are soluble in alcohol, and but slightly or not at all soluble in water, strong alcohol should be used as a menstruum. Whenever it is possible, and consistent with the intended use of the preparation, the alcoholic strength of the menstruum should be made to approach that of Diluted Alcohol, the object being not only to exhaust the Drug of all its useful constituents, but also to retain them in solution.

If the drug is fibrous and can be dried and powdered without injury or loss of useful constituents, percolation is preferable. If the drug is resinous, and partly or almost wholly soluble in the menstruum, or if it is fibrous and cannot well be powdered without undergoing injury, maceration should be resorted to. In the latter case, the drug, comminuted as much as possible, should be kept in contact with the full quantity of the menstruum for two weeks, or until the soluble matters are extracted, the liquid portion strained off, and the remainder of the tincture contained in the residue on the strainer carefully displaced by washing with a fresh portion of the menstruum until *one thousand* (1000) *cubic centimeters* of tincture are obtained for every *one hundred and twenty-five* (125) *grammes* of drug used in the operation.

The preparation of Tinctures from Fluid Extracts, instead of from the original drugs themselves, is not recommended. In some special cases, however, when the crude drug is not accessible, or when a tincture, which is not at hand and otherwise unobtainable, is required for immediate use, it may be prepared, extemporaneously, from the corresponding fluid extract, provided that the latter is known to fully represent the active constituents of the drug which are intended to be contained in the tincture (see formulas 397, 422, 423).

397. TINCTURA ACONITI, FLEMING.

Fleming's Tincture of Aconite.

1. **Aconite** (root), in fine powder, *seven hundred grammes* . . . . 700 Gm.
Alcohol, a sufficient quantity

To make one thousand cubic centimeters . . . . . 1000 Cc.

Moisten the Aconite with enough Alcohol to render it distinctly damp and to maintain it so after twenty-four hours' maceration in a well covered vessel. Then pack it tightly in a percolator, and percolate it slowly, in the usual manner, with Alcohol, until *one thousand* (1000) *cubic centimeters* of tincture are obtained.

Note.—This preparation is still prescribed by many physicians. It is recommended that their attention be directed to the official Fluid Extract and Tincture of Aconite, so that the above preparation may be gradually abandoned.

When this preparation is required for immediate use, and it is not otherwise available, it may be prepared in the following manner (see Note to F. 396):

2. **Fluid Extract of Aconite** (U. S. P.), *seventy cubic centimeters* .	70 Cc.
Alcohol, *thirty cubic centimeters*	30 Cc.

Mix them.

398. TINCTURA AMARA.

Bitter Tincture.

Stomachic Tincture. Bitter Stomachic Drops. Stomach Drops.

Gentian, *fifty grammes*	50 Gm.
Centaury, herb, *fifty grammes*	50 Gm.
Bitter Orange Peel, *thirty-five grammes*	35 Gm.
Orange Berries, *seventeen grammes*	17 Gm.
Zedoary, root, *seventeen grammes*	17 Gm.
Alcohol,	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Reduce the drugs to a moderately coarse (No. 40) powder, and percolate it, in the usual manner, with a mixture of *two* (2) *volumes* of Alcohol and *one* (1) *volume* of Water, until *one thousand* (1000) *cubic centimeters* of percolate are obtained.

Note.—Centaury is the herb of *Erythræa Centaurium* Persoon. Orange Berries are the unripe fruit of *Citrus vulgaris* Risso, collected while small. Zedoary is the rhizome of *Curcuma Zedoaria* Roscoe. The product obtained by the above formula is practically identical with that which is official in the Germ. Pharm.

399. TINCTURA ANTACRIDA.

Antacrid Tincture.

Dysmenorrhœa Mixture. Fenner's Guaiac Mixture.

Corrosive Chloride of Mercury, *five and one-half grammes* .	5.5	Gm.
Guaiac (U. S. P.), in fine powder, *one hundred and twenty-five grammes*	125	Gm.
Canada Turpentine, *one hundred and twenty-five grammes* . .	125	Gm.
Oil of Sassafras, *thirty cubic centimeters*	30	Cc.
Alcohol, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Introduce the Guaiac and the Canada Turpentine into a flask, together with *seven hundred and fifty* (750) *cubic centimeters* of Alcohol, cork the flask loosely, and heat the contents, on a water-bath, slowly to boiling. Then cool the flask, and filter the contents through a small filter. Dissolve the Corrosive Chloride of Mercury in *thirty*

(30) *cubic centimeters* of Alcohol, and add this solution, as well as the Oil of Sassafras, to the filtrate. Lastly, pass enough Alcohol through the filter to make the product measure *one thousand* (1000) *cubic centimeters.*

Each fluidrachm contains nearly ⅓ grain of Corrosive Chloride of Mercury.

Note.—The dose of this preparation is about 10 to 20 minims.

400. TINCTURA ANTIPERIODICA.

Antiperiodic Tincture.

Warburg's Tincture.

1. *Without Aloes.*

Rhubarb, *thirty-six grammes*	36 Gm.
Angelica, seed, *thirty-six grammes*	36 Gm.
Elecampane, *eighteen grammes*	18 Gm.
Saffron, *eighteen grammes*	18 Gm.
Fennel, *eighteen grammes*	18 Gm.
Gentian, *nine grammes*	9 Gm.
Zedoary, root, *nine grammes*	9 Gm.
Cubeb, *nine grammes*	9 Gm.
Myrrh, *nine grammes*	9 Gm.
White Agaric, *nine grammes*	9 Gm.
Camphor, *nine grammes*	9 Gm.
Quinine Sulphate, *one hundred grammes*	100 Gm.
Diluted Alcohol (U. S. P.), a sufficient quantity	
To make five thousand cubic centimeters	5000 Cc.

Reduce the fibrous vegetable drugs to a coarse (No. 20) powder, mix this with the Myrrh and Camphor, previously powdered, and digest the whole, during twelve hours, in a suitable, well-covered vessel, with *forty-two hundred and fifty* (4250) *cubic centimeters* of Diluted Alcohol, on a water-bath, avoiding, as much as possible, any loss of Alcohol by evaporation. Then strain off the liquid with pressure, dissolve the Quinine Sulphate in the strained liquid, with a gentle heat, if necessary, filter, and pass enough Diluted Alcohol, first through the strainer and then through the filter, to make the product measure *five thousand* (5000) *cubic centimeters.*

Each fluidounce contains 10 grains of Quinine Sulphate.

Note.—This preparation, made *without Aloes*, is intended to serve as a stock-tincture, from which the regular "Warburg's Tincture" is to be made, when required. "Warburg's Tincture without Aloes" is also often prescribed or asked for, and in this case the above preparation is to be dispensed.

The original formula directed by Dr. Warburg contained the old *Confectio Damocratis* as one of the ingredients. This is a very complex preparation, many of the constituents of which are unobtainable at the present day. It has, therefore, been omitted.

2. *With Aloes.*

Extract of Aloes (U. S. P.), *seventeen and one-half grammes* . 17.5 Gm.
Antiperiodic Tincture, without Aloes, *one thousand cubic centimeters* . . . . . 1000 Cc.

Dissolve the Extract in the Tincture.

Note.—When "Warburg's Tincture," without any further specification, is ordered, this preparation (containing Aloes) is to be dispensed.

401. TINCTURA AROMATICA.

Aromatic Tincture.

Cinnamon (Cassia), *eighty-five grammes* . . . . . 85 Gm.
Ginger, *thirty-six grammes* . . . . . 36 Gm.
Galangal, root, *eighteen grammes* . . . . . 18 Gm.
Cloves, *eighteen grammes* . . . . . 18 Gm.
Cardamom, *eighteen grammes* . . . . . 18 Gm.
Alcohol,
Water, of each, a sufficient quantity

To make one thousand cubic centimeters . . . . . 1000 Cc.

Reduce the drugs to a moderately coarse (No. 40) powder, and percolate it, in the usual manner, with a mixture of *two* (2) *volumes* of Alcohol and *one* (1) *volume* of Water, until *one thousand* (1000) *cubic centimeters* of percolate are obtained.

Note.—This preparation is practically identical with that which is official in the Germ. Pharm. Galangal is the root of *Alpinia officinarum* Hance.

402. TINCTURA CAPSICI ET MYRRHÆ.

Tincture of Capsicum and Myrrh.

Hot Drops.

Capsicum, in No. 20 powder, *thirty two grammes* . . . . . 32 Gm.
Myrrh, in moderately coarse powder, *one hundred and twenty-five grammes* . . . . . 125 Gm.
Alcohol,
Water, of each, a sufficient quantity

To make one thousand cubic centimeters . . . . . 1000 Cc.

Mix the powders with an equal bulk of clean, fine sand, and percolate them, in the usual manner, with a mixture of *nine* (9) *volumes* of Alcohol, and *one* (1) *volume* of Water, until *one thousand* (1000) *cubic centimeters* of percolate are obtained.

Note.—This preparation is known in some parts of this country by the old Thompsonian name "Number six."

403. TINCTURA CINCHONÆ DETANNATA.

Detannated Tincture of Cinchona.

Fluid Extract of Cinchona (U. S. P.), *one hundred and eighty-five cubic centimeters*	185 Cc.
Alcohol, *five hundred cubic centimeters*	500 Cc.
Solution of Tersulphate of Iron (U. S. P.), *three hundred and seventy-five cubic centimeters*	375 Cc.
Water of Ammonia (U. S. P.), *three hundred and seventy-five cubic centimeters*	375 Cc.
Water,	
Diluted Alcohol (U. S. P.), of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

To the Water of Ammonia, diluted with *fifteen hundred* (1500) *cubic centimeters* of Water, gradually add the Solution of Tersulphate of Iron, previously diluted with *twenty-five hundred* (2500) *cubic centimeters* of Water, under constant stirring. Pour this mixture, containing Ferric Hydrate as a precipitate, upon a wet muslin strainer (which has been tared, after having been wetted and deprived of the excess of water by moderate pressure), and when the liquid has drained off, return the precipitate to the vessel, and mix it intimately with about *four thousand* (4000) *cubic centimeters* of Water. Again drain it on the strainer, transfer it once more to the vessel, and treat it as before. Finally drain and press the precipitate on the strainer until it weighs *five hundred* (500) *grammes*.

Mix the Fluid Extract of Cinchona with *five hundred* (500) *cubic centimeters* of Alcohol, and add the Ferric Hydrate previously prepared. Agitate the mixture frequently, until the tincture is deprived of tannin, which may be known by the absence of a blackish-green color when a small portion of the clear tincture is treated with a drop or two of tincture of chloride of iron. Insert a plug of absorbent cotton into a suitable percolator, and introduce the mixture. As soon as the liquid has disappeared from the surface, pour on enough Diluted Alcohol to make the product measure *one thousand* (1000) *cubic centimeters*.

Note.—This preparation is practically identical, in strength of Cinchona (without the tannin), with the official *Tinctura Cinchonæ*.

404. TINCTURA CONII.

(U. S. P., 1880.)

Tincture of Conium.

Conium (fruit), in No. 30 powder, *one hundred and fifty grammes*	150 Gm.
Diluted Hydrochloric Acid, *four grammes*	4 Gm.
Diluted Alcohol, a sufficient quantity	
To make one thousand grammes	1000 Gm.

Moisten the powder with *fifty* (50) *grammes* of Diluted Alcohol, previously mixed with the Diluted Hydrochloric Acid, and macerate for twenty-four hours; then pack it moderately in a conical glass percolator, and gradually pour Diluted Alcohol upon it until *one thousand* (1000) *grammes* of Tincture are obtained.

405. TINCTURA COTO.

Tincture of Coto.

Coto bark, bruised, *one hundred and twenty-five grammes* . . .	125 Gm.
Alcohol, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Macerate the Coto with *eight hundred and fifty* (850) *cubic centimeters* of Alcohol during seven days; then pour off the liquid, press the residue, and filter the united liquids through paper. Lastly, wash the residue transferred to the filter with enough Alcohol to make the product measure *one thousand* (1000) *cubic centimeters.*

Note.—Coto bark is derived from an undetermined tree, probably belonging to the natural order Lauraceæ, and is obtained from Bolivia. There are two varieties known, one as "Coto," and the other as "Paracoto" bark. True Coto bark is, at times, difficult to obtain in the market, and the Paracoto bark is then frequently substituted for it. While they possess some useful properties in common, yet they differ materially in other respects. Hence, the Paracoto bark should not be substituted for the true Coto bark.

406. TINCTURA FERRI CHLORIDI ÆTHEREA.

Ethereal Tincture of Chloride of Iron.

Bestucheff's Tincture. Lamotte's Drops.

Solution of Chloride of Iron (U. S. P.), *forty-five cubic centimeters*	45 Cc.
Ether (U. S. P.), *two hundred and fifty cubic centimeters*	250 Cc.
Alcohol, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Solution of Chloride of Iron with *six hundred* (600) *cubic centimeters* of Alcohol, add the Ether, and lastly, enough Alcohol to make *one thousand* (1000) *cubic centimeters.* Introduce the Tincture into bottles made of white (flint) glass, which should not be entirely filled. Cork them tightly and expose them to the rays of the sun, until the Tincture has been completely decolorized. Then remove the bottles to a shady place, and open them occasionally, until the contents have again assumed a yellow color. Lastly, transfer the tincture to bottles, which should be well stoppered and kept in a cool and dark place.

Each fluidrachm represents about ½ grain of metallic Iron.

Note.—This preparation is practically identical with that which is official in the Germ. Pharm.

407. TINCTURA FERRI CITRO-CHLORIDI.

Tincture of Citro-Chloride of Iron.

Tasteless Tincture of Chloride of Iron. Tasteless Tincture of Iron.

Solution of Chloride of Iron (U. S. P.), *two hundred and fifty cubic centimeters*	250 Cc.
Sodium Citrate, *four hundred and sixty grammes*	460 Gm.
Alcohol, *one hundred and sixty cubic centimeters*	160 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Solution of Chloride of Iron with *two hundred and fifty* (250) *cubic centimeters* of Water, and dissolve in this mixture the Sodium Citrate with the aid of a gentle heat. Then add the Alcohol, and when the solution has become cold, make up the volume with water to *one thousand* (1000) *cubic centimeters.* Set the product aside in a cold place for a few days, if convenient, so that the excess of saline matter may separate. Then filter, and pass enough cold Water through the filter to restore the original volume.

Each fluidrachm contains an amount of Iron equivalent to about 7½ grains of dry Chloride of Iron (ferric).

Note.—This preparation is practically identical in the strength of iron, but not in the quantity of alcohol, with the official *Tinctura Ferri Chloridi.*

408. TINCTURA FERRI POMATA.

Tincture of Ferrated Extract of Apples.

Tinctura Ferri Malatis Crudi. Tincture of Crude Malate of Iron.

Ferrated Extract of Apples (F. 156), *one hundred grammes*	100 Gm.
Alcohol, *one hundred cubic centimeters*	100 Cc.
Cinnamon Water (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Ferrated Extract of Apples in *seven hundred and fifty* (750) *cubic centimeters* of Cinnamon Water, add the Alcohol, filter, and pass enough Cinnamon Water through the filter to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents about ⅜ grain of metallic Iron.

Note.—This preparation is practically identical with that official in the Germ. Pharm.

409. TINCTURA GUAIACI COMPOSITA.

Compound Tincture of Guaiac.

Dewees' Tincture of Guaiac.

Guaiac (U. S. P.), *one hundred and twenty-five grammes*	125 Gm.
Potassium Carbonate, *six grammes*	6 Gm.
Pimenta, in moderately fine powder, *thirty grammes*	30 Gm.
Pumice, in fine powder, *sixty grammes*	60 Gm.
Alcohol, *four hundred and thirty-five cubic centimeters*	435 Cc.
Water, *four hundred and thirty-five cubic centimeters*	435 Cc.
Diluted Alcohol, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Guaiac and Potassium Carbonate with the Pimenta and the Pumice, and afterwards gradually with the Alcohol. Next add slowly *four hundred and thirty-five* (435) *cubic centimeters* of cold Water and triturate the mixture thoroughly. Then filter, and pass enough Diluted Alcohol through the filter to make *one thousand* (1000) *cubic centimeters*.

Each fluidrachm represents 7½ grains of Guaiac.

410. TINCTURA IGNATIÆ.

(U. S. P., 1880.)

Tincture of Ignatia.

Ignatia, in No. 60 powder, *ten grammes*	10 Gm.
Alcohol,	
Water, of each	a sufficient quantity.

Mix Alcohol and Water in the proportion of *eight* (8) *parts* by weight of Alcohol to *one* (1) *part* of Water. Moisten the Powder with *ten* (10) *grammes* of the menstruum, and macerate for twenty-four hours; then pack it firmly in a cylindrical percolator, and gradually pour menstruum upon it, until the Ignatia is exhausted. Reserve the first *ninety* (90) *grammes*, evaporate the remainder to *ten* (10) *grammes*, and mix with the reserved portion. Of this tincture, take any convenient number of parts, and, by means of a water-bath, evaporate it to dryness. Weigh the resulting extract, and from its weight calculate the quantity of extract contained in the *one hundred* (100) *parts* of Tincture obtained; then dissolve the dried extract in the remainder of the Tincture, and add enough of the above menstruum to make the product weigh so many parts that each *one hundred* (100) *parts* of Tincture shall contain *one* (1) *part* of dry extract. Lastly, mix thoroughly, and filter through paper.

Tincture of Ignatia thus prepared represents about 10 grammes of Ignatia in 100 grammes.

411. TINCTURA IODI, CHURCHILL.

Churchill's Tincture of Iodine.

Iodine, *one hundred and sixty-five grammes*	165 Gm.
Potassium Iodide, *thirty-three grammes*	33 Gm.
Water, *two hundred and fifty cubic centimeters*	250 Cc.
Alcohol, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Potassium Iodide in the Water, then add the Iodine, and lastly, enough Alcohol to make the Tincture, when completed, measure *one thousand* (1000) *cubic centimeters.*

Note.—Churchill's Tincture of Iodine should not be confounded with Churchill's Iodine Caustic (*Liquor Iodi Causticus*, F. 227).

412. TINCTURA IODI DECOLORATA.

Decolorized Tincture of Iodine.

Iodine, *eighty-three grammes*	83 Gm.
Sodium Hyposulphite, *eighty-three grammes*	83 Gm.
Water, *one hundred cubic centimeters*	100 Cc.
Stronger Water of Ammonia (U. S. P.), *sixty-five cubic centimeters*	65 Cc.
Alcohol, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Digest the Iodine, Sodium Hyposulphite, and Water, at a gentle heat, until a perfect solution, of a dark reddish-brown color, is produced. Then add *one hundred and twenty-five* (125) *cubic centimeters* of Alcohol, and afterwards, the Stronger Water of Ammonia. Shake a few minutes until no more bubbles of gas escape, and the liquid has become colorless, with a whitish precipitate (of sulphur) suspended in it. Cool it, if necessary, and add enough Alcohol to make *one thousand* (1000) *cubic centimeters.* Place the bottle containing it in a refrigerator for a few hours, or longer if convenient, then filter, in a covered funnel, and preserve the liquid for use.

Note.—On prolonged standing a crystalline precipitate, of sodium tetrathionate, will usually form in the liquid. This may be removed by filtration.

413. TINCTURA JALAPÆ.

Tincture of Jalap.

Jalap, in fine powder, *two hundred grammes*	200 Gm.
Alcohol,	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix *two* (2) *volumes* of Alcohol with *one* (1) *volume* of Water. Per-

colate the Jalap with this mixture, in the usual manner, until *one thousand* (1000) *cubic centimeters* of Tincture are obtained.

Note.--This preparation was official in the U. S. P. of 1870.

414. TINCTURA JALAPÆ COMPOSITA.

Compound Tincture of Jalap.

Jalap, in fine powder, *one hundred and twenty-five grammes* . .	125 Gm.
Scammony, in powder, *thirty-two grammes*	32 Gm.
Alcohol,	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix *two* (2) *volumes* of Alcohol, with *one* (1) *volume* of Water. Mix the powders with half their weight of sand; moisten the mixture with a sufficient quantity of the menstruum, pack it in a percolator, and percolate it with the menstruum, in the usual manner, until *one thousand* (1000) *cubic centimeters* of Tincture are obtained.

415. TINCTURA KINO COMPOSITA.

Compound Tincture of Kino.

Tincture of Kino (U. S. P.), *one hundred cubic centimeters* . .	100 Cc.
Tincture of Opium (U. S. P.), *one hundred cubic centimeters* .	100 Cc.
Spirit of Camphor (U. S. P.), *sixty-five cubic centimeters* . . .	65 Cc.
Oil of Cloves, *one and one-half cubic centimeters*	1.5 Cc.
Cochineal, in powder, *nine grammes*	9 Gm.
Aromatic Spirit of Ammonia (U. S. P.), *eight cubic centimeters*	8 Cc.
Diluted Alcohol (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Cochineal with the Aromatic Spirit of Ammonia, and gradually add *seven hundred* (700) *cubic centimeters* of Diluted Alcohol. Then add the two Tinctures, the Spirit of Camphor, and the Oil of Cloves, and filter the mixture through paper. Lastly, pass enough Diluted Alcohol through the filter to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents about ½ grain, each, of Kino and of Powdered Opium.

416. TINCTURA PAPAVERIS.

Tincture of Poppy.

Poppy capsules, freed from seeds, and in coarse powder, *five hundred grammes*	500 Gm.
Glycerin, *one hundred and twenty-five cubic centimeters*	125 Cc.
Alcohol,	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Digest the Poppy capsules with *three thousand* (3000) *cubic centimeters* of boiling Water during two hours, then express and strain. Evaporate the strained liquid to *five hundred* (500) *cubic centimeters*, mix it with *two hundred and fifty* (250) *cubic centimeters* of Alcohol, and set the mixture aside, well covered, until it is quite cold. Then filter, add the Glycerin to the filtrate, and pass enough of a mixture of *two* (2) *volumes* of Water and *one* (1) *volume* of Alcohol through the filter, to make the product measure *one thousand* (1000) *cubic centimeters*.

Each fluidrachm represents 30 grains of Poppy (Capsule) freed from seeds.

417. TINCTURA PECTORALIS.

Pectoral Tincture.

Guttæ Pectorales. Pectoral Drops. Bateman's Pectoral Drops.

Tincture of Opium (U. S. P.), *forty-two cubic centimeters* . . .	42 Cc.
Compound Tincture of Catechu (U. S. P.), *thirty cubic centimeters*	30 Cc.
Spirit of Camphor (U. S. P.), *forty cubic centimeters*	40 Cc.
Oil of Anise, *one cubic centimeter*	1 Cc.
Caramel, *sixteen cubic centimeters*	16 Cc.
Diluted Alcohol (U. S. P.)., a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the first five ingredients with enough Diluted Alcohol to make *one thousand* (1000) *cubic centimeters*, and filter.

Each fluidrachm contains 2½ minims of Tincture of Opium.

418. TINCTURA PERSIONIS.

Tincture of Cudbear.

Cudbear, in fine powder, *one hundred and twenty-five grammes.*	125 Gm.
Alcohol,	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Pack the Cudbear in a suitable percolator, and percolate it with a mixture of *one* (1) *volume* of Alcohol and *two* (2) *volumes* of Water, until *one thousand* (1000) *cubic centimeters* of Tincture are obtained.

Note.—This preparation is intended as a coloring agent, when a bright-red tint or color is to be produced, particularly in acid liquids.

419. TINCTURA PERSIONIS COMPOSITA.

Compound Tincture of Cudbear.

Cudbear, *twenty grammes*	20 Gm.
Caramel, *one hundred grammes*	100 Gm.
Alcohol,	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix *one* (1) *volume* of Alcohol with *two* (2) *volumes* of Water. Macerate the Cudbear with *seven hundred and fifty* (750) *cubic centimeters* of the menstruum, during twelve hours, agitating occasionally, and then filter through paper, and add the Caramel, previously dissolved in *one hundred and twenty-five* (125) *cubic centimeters* of Water. Then pass enough of the before-mentioned menstruum through the filter to make the whole measure *one thousand* (1000) *cubic centimeters.*

Note.—This preparation is intended as a coloring agent, when a brownish-red tint or color is to be produced.

420. TINCTURA PIMPINELLÆ.

Tincture of Pimpinella.

Pimpinella, root, *one hundred and sixty-five grammes*	165 Gm.
Alcohol,	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix *two* (2) *volumes* of Alcohol with *one* (1) *volume* of Water. Macerate the Pimpinella, reduced to a moderately coarse (No. 40) powder, with enough of the menstruum to keep it distinctly damp during twelve hours. Then percolate it with the same menstruum, in the usual manner, until *one thousand* (1000) *cubic centimeters* of Tincture are obtained.

Note.—This preparation is approximately of the same strength as that which is official in the *Germ. Pharm.* Pimpinella root is derived from *Pimpinella Saxifraga* Linné, and *Pimpinella magna* Linné.

421. TINCTURA RHEI AQUOSA.

Aqueous Tincture of Rhubarb.

1. **Rhubarb,** *one hundred grammes*	100 Gm.
Sodium Borate, *ten grammes*	10 Gm.
Potassium Carbonate, *ten grammes*	10 Gm.
Cinnamon Water (U. S. P.), *one hundred and fifty cubic centimeters*	150 Cc.
Alcohol, *one hundred and twenty cubic centimeters*	120 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Sodium Borate and the Potassium Carbonate in *seven hundred* (700) *cubic centimeters* of Water, and macerate in this solution, during twenty-four hours, the Rhubarb, cut into thin slices and carefully freed from any adhering fine powder. Then strain it through muslin, heat the strained liquid to boiling, add the Cinnamon Water and Alcohol, stir it well and filter, while warm, in a covered funnel.

To the cold filtrate add enough Water to make the product measure *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents about 5⅔ grains of Rhubarb.

Note.—The product is practically identical with that obtained by the process of the Germ. Pharm., in which this preparation is official. It is liable to deteriorate when kept too long, and should not be prepared in larger quantity than may be consumed within a short time.

When this preparation is required for immediate use, and it is not otherwise obtainable, it may be prepared in the following manner:

2. Fluid Extract of Rhubarb (U. S. P.), *one hundred cubic centimeters*	100 Cc.
Sodium Borate, *ten grammes*	10 Gm.
Potassium Carbonate, *ten grammes*	10 Gm.
Cinnamon Water (U. S. P.), *one hundred and fifty cubic centimeters*	150 Cc.
Alcohol, *seventy-five cubic centimeters*	75 Cc.
Water, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Sodium Borate and the Potassium Carbonate in about *five hundred* (500) *cubic centimeters* of Water. Add the Cinnamon Water, Alcohol, and Fluid Extract of Rhubarb, and lastly, enough Water to make the product measure *one thousand* (1000) *cubic centimeters.* Filter, if necessary.

422. TINCTURA RHEI ET GENTIANÆ.

Tincture of Rhubarb and Gentian.

1. Rhubarb, *seventy grammes*	70 Gm.
Gentian, *seventeen and one-half grammes*	17.5 Gm.
Diluted Alcohol (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Reduce the solids to a moderately coarse (No. 40) powder, and percolate it, in the usual manner, with Diluted Alcohol, until *one thousand* (1000) *cubic centimeters* of percolate are obtained.

Each fluidrachm represents 4 grains of Rhubarb and 1 grain of Gentian.

Note.—When this preparation is required for immediate use, and it is not otherwise obtainable, it may be prepared in the following manner:

2. Fluid Extract of Rhubarb (U. S. P.), *seventy cubic centimeters.*	70 Cc.
Fluid Extract of Gentian (U. S. P.), *seventeen and one-half cubic centimeters*	17.5 Cc.
Diluted Alcohol (U. S. P.), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Fluid Extracts with enough Diluted Alcohol to make *one thousand* (1000) *cubic centimeters,* and filter.

423. TINCTURA RHEI VINOSA.

Vinous Tincture of Rhubarb.

Fluid Extract of Rhubarb (U. S. P.), *eighty cubic centimeters.*	80 Cc.
Fluid Extract of Bitter Orange Peel (U. S. P.), *twenty cubic centimeters*	20 Cc.
Tincture of Cardamom (U. S. P.), *eighty cubic centimeters* . .	80 Cc.
Sugar, *one hundred and twenty-five grammes*	125 Gm.
Sherry Wine, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Fluid Extracts and the Tincture with *five hundred* (500) *cubic centimeters* of Sherry Wine. In this dissolve the Sugar by agitation, then add enough Sherry Wine to make *one thousand* (1000) *cubic centimeters*, and filter.

Note.—This preparation corresponds, in strength, to that which is official in the Germ. Pharm.

424. TINCTURA SAPONIS VIRIDIS COMPOSITA.

Compound Tincture of Green Soap.

Soft Soap (U. S. P.), *one hundred and fifty grammes*	150 Gm.
Oil of Cade, *twenty cubic centimeters*	20 Cc.
Alcohol, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Soft Soap in *seven hundred and fifty* (750) *cubic centimeters* of Alcohol, add the Oil of Cade, and then enough Alcohol to make the product measure *one thousand* (1000) *cubic centimeters*, and filter.

425. TINCTURA TOLUTANA SOLUBILIS.

Soluble Tincture of Tolu.

Balsam of Tolu, *one hundred grammes*	100 Gm.
Magnesium Carbonate, *ten grammes*	10 Gm.
Glycerin, *four hundred cubic centimeters*	400 Cc.
Water,	
Alcohol, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix *two hundred* (200) *cubic centimeters* of Alcohol with the Glycerin, and dissolve the Balsam of Tolu in the mixture with the aid of heat, avoiding loss by evaporation. Next add *four hundred* (400) *cubic centimeters* of Water, and allow the mixture to become cold. Pour off the milky liquid from the resinous precipitate (which latter is to be rejected), mix it with the Magnesium Carbonate, by trituration, and filter.

Lastly, pass enough of a mixture of *one* (1) *volume* of Alcohol and *two* (2) *volumes* of Water through the filter, to make the whole filtrate measure *one thousand* (1000) *cubic centimeters.*

Note.—This preparation may be added to Syrup or Water without producing cloudiness. A mixture of 1 fluidounce of this preparation with 15 fluidounces of Syrup yields a product which may be used as Syrup of Tolu in all cases where the official preparation is not required.

426. TINCTURA VANILLINI COMPOSITA.

Compound Tincture of Vanillin.

Compound Essence of Vanillin.

Vanillin, *six and one-half grammes*	6.5	Gm.
Cumarin, *four decigrammes*	0.4	Gm.
Alcohol, *two hundred cubic centimeters*	200	Cc.
Glycerin, *one hundred and twenty-five cubic centimeters*	125	Cc.
Syrup (U. S. P.), *one hundred and twenty-five cubic centimeters.*	125	Cc.
Compound Tincture of Cudbear (F. 419), *sixteen cubic centimeters*	16	Cc.
Water, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Vanillin and Cumarin in the Alcohol, add the Glycerin, Syrup, and Compound Tincture of Cudbear, and lastly, enough Water to make *one thousand* (1000) *cubic centimeters.*

427. TINCTURA VIBURNI OPULI COMPOSITA.

Compound Tincture of Viburnum.

Viburnum Opulus, *thirty-five grammes*	35	Gm.
Dioscorea, *thirty-five grammes*	35	Gm.
Scullcap, *ten grammes*	10	Gm.
Cloves, *fifty grammes*	50	Gm.
Cinnamon, *sixty-five grammes*	65	Gm.
Glycerin, *sixty-five cubic centimeters*	65	Cc.
Alcohol,		
Water, of each, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Reduce the drugs to a moderately coarse (No. 40) powder. Mix the Glycerin with *seven hundred and fifty* (750) *cubic centimeters* of Alcohol and moisten the powder with *one hundred and fifty* (150) *cubic centimeters* of this Mixture, and macerate for 48 hours in a percolator. Then percolate with the remainder of this menstruum, followed by a mixture of *five* (5) *volumes* of Alcohol and *one* (1) *volume* of Water, until *one thousand* (1000) *cubic centimeters* of tincture are obtained.

428. TINCTURA ZEDOARIÆ AMARA.

Bitter Tincture of Zedoary.

Compound Tincture of Zedoary.

Zedoary, root, *two hundred and fifty grammes*	250 Gm.
Aloes, *one hundred and twenty-five grammes*	125 Gm.
Rhubarb, *sixty-two grammes*	62 Gm.
Gentian, *sixty-two grammes*	62 Gm.
White Agaric, *sixty-two grammes*	62 Gm.
Saffron, *sixty-two grammes*	62 Gm.
Glycerin, *one hundred and twenty-five cubic centimeters*	125 Cc.
Alcohol,	
Water, of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Reduce the solids to a moderately coarse (No. 40) powder, moisten this with a sufficient quantity of a mixture of *two* (2) *volumes* of Alcohol and *one* (1) *volume* of Water, and percolate it in the usual manner, with this menstruum, until *seven hundred and fifty* (750) *cubic centimeters* of percolate are obtained. Add to this the Glycerin and set it aside. Then continue the percolation, until the drugs are practically exhausted, evaporate the new percolate to *one hundred and twenty-five* (125) *cubic centimeters*, and add it to the reserved portion.

Each fluidrachm represents 15 grains of Zedoary, 7½ grains of Aloes, and 3¾ grains, each, of the other drugs.

Note.—The above preparation is not identical with the *Tinctura Zedoariæ Composita* (also known as *Tinctura Carminativa*, *Tinctura Wedelii*) which was formerly official in some continental Pharmacopœias.

429. TINCTURÆ ÆTHEREÆ.

Ethereal Tinctures.

General Formula.

The Drug, properly comminuted, *one hundred and twenty-five grammes*	125 Gm.
Alcohol,	
Ether (U. S. P.), of each, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Percolate the Drug in the usual manner, but with proper precautions to avoid loss of menstruum by evaporation, with a mixture of *one* (1) *volume* of Ether, and *two* (2) *volumes* of Alcohol, until *one thousand* (1000) *cubic centimeters* of percolate are obtained.

Note.—This formula is to be used, when Ethereal Tinctures of Belladonna, Castor, Digitalis, Lobelia, Valerian, or of other drugs, are to be prepared.

430. TROCHISCI MAGNESIÆ.

(U. S. P., 1880.)

Troches of Magnesia.

Magnesia, *nineteen and one-half grammes*	19.50 Gm.
Nutmeg, in fine powder, *one gramme*	1 Gm.
Sugar, in fine powder, *fifty-eight and one-half grammes*	58.5 Gm.
Mucilage of Tragacanth (U. S. P.), a sufficient quantity	
To make one hundred troches	100 troches.

Rub the Magnesia and the powders together until they are thoroughly mixed; then with Mucilage of Tragacanth, form a mass, to be divided into *one hundred* (100) *troches*.

431. TROCHISCI SODII SANTONINATIS.

(U. S. P., 1880.)

Troches of Sodium Santoninate.

Sodium Santoninate, in fine powder, *six and one-half grammes*	6.50 Gm.
Sugar, in fine powder, *one hundred and thirty grammes*	130 Gm.
Tragacanth, in fine powder, *three and three-fourths grammes*	3.75 Gm.
Orange Flower Water, a sufficient quantity	
To make one hundred troches	100 troches.

Rub the powders together until they are thoroughly mixed, then, with Orange Flower Water, form a mass, to be divided into *one hundred* (100) *troches*.

Troches of Sodium Santoninate should be kept in dark amber-colored vials.

432. UNGUENTUM ACIDI GALLICI.

(U. S. P., 1880.)

Ointment of Gallic Acid.

Gallic Acid, *ten grammes*	10 Gm.
Benzoinated Lard (U. S. P.), *ninety grammes*	90 Gm.

Rub the Gallic Acid with the Benzoinated Lard, gradually added, until they are thoroughly mixed, avoiding the use of an iron spatula.

433. UNGUENTUM CALAMINÆ.

Calamine Ointment.

Unguentum Zinci Carbonatis (Impuri). Unguentum Calaminare. Turner's Cerate.

Prepared Calamine, *sixteen and one-half grammes*	16.5 Gm.
Ointment (U. S. P.), *eighty-three and one-half grammes*	83.5 Gm.

Mix them intimately, by trituration, so as to produce a smooth and homogeneous ointment.

434. UNGUENTUM CAMPHORÆ.

Camphor Ointment.

Unguentum Camphoratum.

Camphor, in coarse powder, *twenty-two grammes*	22 Gm.
White Wax, *eleven grammes*	11 Gm.
Lard, *sixty-seven grammes*	67 Gm.

Melt the White Wax and Lard with a gentle heat, then add the Camphor, and stir the Ointment until it is cold.

435. UNGUENTUM FUSCUM.

Brown Ointment.

Unguentum Matris. Mother's Salve.

Camphorated Brown Plaster (F. 119), *fifty grammes*	50 Gm.
Olive Oil, *twenty-five grammes*	25 Gm.
Suet, *twenty-five grammes*	25 Gm.

Melt them together, and stir the mass until it is cold.

436. UNGUENTUM MEZEREI.

(U. S. P., 1880.)

Mezereum Ointment.

Fluid Extract of Mezereum (F. 170), *twenty-five cubic centimeters*	25 Cc.
Lard, *eighty grammes*	80 Gm.
Yellow Wax, *twelve grammes*	12 Gm.

Melt together the Lard and Wax with a moderate heat, add the Fluid Extract, and stir the mixture constantly until the Alcohol has evaporated; then continue to stir until cool.

437. UNGUENTUM PICIS COMPOSITUM.

Compound Tar Ointment.

Oil of Tar, *four grammes*	4 Gm.
Tincture of Benzoin (U. S. P.), *two cubic centimeters*	2 Cc.
Oxide of Zinc, *three grammes*	3 Gm.
Yellow Wax, *twenty-six grammes*	26 Gm.
Lard, *thirty-two grammes*	32 Gm.
Cotton Seed Oil, *thirty-five grammes*	35 Gm.

Melt the Yellow Wax and Lard with the Cotton Seed Oil at a gentle heat. Add the Tincture of Benzoin, and continue heating until all the Alcohol has evaporated. Then withdraw the heat, add the Oil of Tar, and finally the Oxide of Zinc, incorporating the latter thoroughly, so that on cooling, a smooth, homogeneous ointment may result.

438. UNGUENTUM SULPHURIS ALKALINUM.

(U. S. P., 1880.)

Alkaline Sulphur Ointment.

Washed Sulphur, *twenty grammes*	20 Gm.
Potassium Carbonate, *ten grammes*	10 Gm.
Water, *five cubic centimeters*	5 Cc.
Benzoinated Lard (U. S. P.), *sixty-five grammes*	65 Gm.

Rub the Sulphur with the Potassium Carbonate and the Water, gradually add the Benzoinated Lard, and mix thoroughly.

439. UNGUENTUM SULPHURIS COMPOSITUM.

Compound Sulphur Ointment.

Wilkinson's Ointment. Hebra's Itch Ointment.

Precipitated Calcium Carbonate, *ten grammes*	10 Gm.
Sublimed Sulphur, *fifteen grammes*	15 Gm.
Oil of Cade, *fifteen grammes*	15 Gm.
Soft Soap (U. S. P.), *thirty grammes*	30 Gm.
Lard, *thirty grammes*	30 Gm.

Mix the Lard with the Soft Soap and Oil of Cade. Then gradually incorporate the Sublimed Sulphur and Precipitated Calcium Carbonate.

440. VINUM ALBUM FORTIUS.

(U. S. P., 1880.)

Stronger White Wine.

White Wine, *eight hundred and seventy-five grammes*	875 Gm.
Alcohol, *one hundred and twenty-five grammes*	125 Gm.

Mix them.

When tested for Alcohol, Stronger White Wine should contain not less than twenty (20) *per cent. nor more than twenty-five* (25) *per cent. of Absolute Alcohol by weight.*

441. VINUM ALOES.

(U. S. P., 1880.)

Wine of Aloes.

Purified Aloes (U. S. P.), *sixty grammes*	60 Gm.
Cardamom, *ten grammes*	10 Gm.
Ginger, *ten grammes*	10 Gm.
Stronger White Wine (F. 440), a sufficient quantity	
To make one thousand grammes	1000 Gm.

Mix the Aloes, Cardamom, and Ginger, and reduce them to a moderately coarse (No. 40) powder. Macerate the powder with *nine hun-*

dred (900) *grammes* of Stronger White Wine for seven days, with occasional agitation, and filter through paper, adding, through the filter, enough Stronger White Wine to make the filtered liquid weigh *one thousand* (1000) *grammes*.

442. VINUM AURANTII.

Wine of Orange.

Oil of Bitter Orange, *one cubic centimeter*	1 Cc.
Alcohol, *ten cubic centimeters*	10 Cc.
Purified Talcum (F. 395), *fifteen grammes*	15 Gm.
Sherry Wine, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Triturate the Purified Talcum, first with the Alcohol, in which the Oil of Bitter Orange had previously been dissolved, and afterwards with *seven hundred and fifty* (750) *cubic centimeters* of Sherry Wine, gradually added. Filter the mixture through a wetted filter, returning the first portions of the filtrate until it runs through clear, and lastly, pass enough Sherry Wine through the filter to make *one thousand* (1000) *cubic centimeters*.

443. VINUM AURANTII COMPOSITUM.

Compound Wine of Orange.

Elixir Aurantiorum Compositum (Germ. Pharm.). *Compound Elixir of Orange*:

Bitter Orange Peel, *two hundred grammes*	200 Gm.
Absinthium, *sixty-five grammes*	65 Gm.
Menyanthes, leaves, *sixty-five grammes*	65 Gm.
Cascarilla, *sixty-five grammes*	65 Gm.
Cinnamon (Cassia), *forty grammes*	40 Gm.
Gentian, *forty grammes*	40 Gm.
Potassium Carbonate, *ten grammes*	10 Gm.
Sherry Wine, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Reduce the six first-named drugs to a moderately coarse (No. 40) powder, mix with this the Potassium Carbonate, moisten the mixture with Sherry Wine, and let it macerate during twenty-four hours. Then pack it in a percolator, and percolate with Sherry Wine, in the usual manner, until *one thousand* (1000) *cubic centimeters* of product are obtained.

Note.—The Germ. Pharm. directs to macerate the Orange Peel, Cinnamon and Potassium Carbonate, with the Sherry Wine, and then to add the other drugs in form of extracts. The proportions above given produce a product practically identical with that of the Germ. Pharm.

444. VINUM CARNIS.

Wine of Beef.

Beef and Wine.

Extract of Beef, *thirty-five grammes*	35 Gm.
Hot Water, *sixty cubic centimeters*	60 Cc.
Sherry Wine, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Pour the Hot Water upon the Extract of Beef contained in a mortar or other suitable vessel, and triturate until a smooth mixture results. Then gradually add, while stirring, *nine hundred* (900) *cubic centimeters* of Sherry Wine. Transfer the mixture to a bottle, set this aside for a few days in a cold place, if convenient, then filter, and pass enough Sherry Wine through the filter to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents 2 grains of Extract of Beef.

Note.—The Extract of Beef suitable for this or similar preparations is that which is prepared by Liebig's method.

445. VINUM CARNIS ET FERRI.

Wine of Beef and Iron.

Beef, Wine and Iron.

Extract of Beef, *thirty-five grammes*	35 Gm.
Tincture of Citro-Chloride of Iron (F. 407), *thirty-five cubic centimeters*	35 Cc.
Hot Water, *sixty cubic centimeters*	60 Cc.
Sherry Wine, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Pour the Hot Water upon the Extract of Beef contained in a mortar or other suitable vessel, and triturate until a smooth mixture results. Then gradually add, while stirring, *eight hundred* (800) *cubic centimeters* of Sherry Wine. Next add the Tincture and enough Sherry Wine to make *one thousand* (1000) *cubic centimeters.* Transfer the mixture to a bottle, set this aside for a few days in a cold place, if convenient, filter, and pass enough Sherry Wine through the filter to restore the original volume.

Each fluidrachm represents 2 grains of Extract of Beef, and 2 minims of Tincture of Citro-Chloride of Iron.

Note.—Regarding Extract of Beef, see Note to F. 444.

446. VINUM CARNIS, FERRI ET CINCHONÆ.

Wine of Beef, Iron and Cinchona.

Beef, Wine, Iron and Cinchona.

Extract of Beef, *thirty-five grammes*	35	Gm.
Tincture of Citro-Chloride of Iron (F. 407), *thirty-five cubic centimeters*	35	Cc.
Quinine Sulphate, *two grammes*	2	Gm.
Cinchonidine Sulphate, *one gramme*	1	Gm.
Citric Acid, *seventy-five centigrammes*	0.75	Gm.
Hot Water, *sixty cubic centimeters*	60	Cc.
Angelica Wine, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Citric Acid and the Quinine and Cinchonidine Sulphates in the Hot Water, and pour the solution upon the Extract of Beef contained in a mortar, or other suitable vessel. Triturate the liquid with the Extract, until they form a smooth mixture, then gradually add, while stirring, *eight hundred* (800) *cubic centimeters* of Angelica Wine, and afterwards the Tincture of Citro-Chloride of Iron. Transfer the mixture to a bottle, set this aside for a few days in a cold place, if convenient, filter, and pass enough Angelica Wine through the filter to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents about 2 grains of Extract of Beef, 2 minims of Tincture of Citro-Chloride of Iron, and small quantities of Cinchona alkaloids.

Note.—Regarding Extract of Beef, see Note to F. 444. Angelica Wine is a variety of sweet California wine.

447. VINUM ERYTHROXYLI.

Wine of Erythroxylon.

Wine of Coca.

Fluid Extract of Erythroxylon (U. S. P.), *sixty-five cubic centimeters*	65	Cc.
Alcohol, *sixty-five cubic centimeters*	65	Cc.
Sugar, *sixty-five grammes*	65	Gm.
Claret Wine, a sufficient quantity		
To make one thousand cubic centimeters	1000	Cc.

Dissolve the Sugar in about *six hundred* (600) *cubic centimeters* of Claret Wine, add the Alcohol and Fluid Extract, and enough Claret Wine to make *one thousand* (1000) *cubic centimeters.* Let the mixture stand a few days in a cold place, if convenient, then filter and pass enough Claret Wine through the filter, to restore the original volume.

Each fluidounce represents 30 grains of Erythroxylon (Coca).

Note.—In place of Claret Wine, any other palatable wine may be used, according to the demand or preference of the prescriber or consumer.

448. VINUM ERYTHROXYLI AROMATICUM.

Aromatic Wine of Erythroxylon.

Aromatic Wine of Coca.

Fluid Extract of Erythroxylon (U. S. P.), *sixty-five cubic centimeters*	65 Cc.
Compound Elixir of Taraxacum (F. 111), *ten cubic centimeters*	10 Cc.
Syrup of Coffee (F. 367), *twenty-five cubic centimeters*	25 Cc.
Port Wine, *one hundred and sixty-five cubic centimeters*	165 Cc.
Aromatic Elixir (U. S. P.), *three hundred cubic centimeters*	300 Cc.
Sherry Wine, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the five first-named ingredients with *four hundred* (400) *cubic centimeters* of Sherry Wine. Let the mixture stand several days in a cold place, if convenient, then filter, and pass enough Sherry Wine through the filter to make the product measure *one thousand* (1000) *cubic centimeters.*

Each fluidounce represents 30 grains of Erythroxylon (Coca).

449. VINUM FRAXINI AMERICANÆ.

Wine of White Ash.

Fraxinus (bark) in No. 40 powder, *five hundred grammes*	500 Gm.
Stronger White Wine (F. 440), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Moisten the powdered Fraxinus with *one thousand* (1000) *cubic centimeters* of Stronger White Wine, macerate it during three days in a well covered vessel, then pack it in a percolator, and gradually pour on Stronger White Wine, until *one thousand* (1000) *cubic centimeters* of percolate are obtained. Keep the product in well-stoppered bottles, which should be completely filled, and stored in a cool place.

Each fluidrachm represents 30 grains of Fraxinus (bark).

Note.—Fraxinus bark is the inner bark of the trunk or root of *Fraxinus Americana* Linné (White Ash).

450. VINUM PEPSINI.

Wine of Pepsin.

Pepsin (U. S. P.), *seventeen and one-half grammes*	17.5 Gm.
Glycerin, *fifty cubic centimeters*	50 Cc.
Hydrochloric Acid (U. S. P.), *four cubic centimeters*	4 Cc.
Water, *sixty cubic centimeters*	60 Cc.
Purified Talcum (F. 395), *sixteen grammes*	16 Gm.
Stronger White Wine (F. 440), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Mix the Water, Glycerin and Hydrochloric Acid, and agitate the Pepsin with the mixture until it is completely disintegrated and apparently dissolved. Then add enough Stronger White Wine to make *one thousand* (1000) *cubic centimeters*, mix the liquid intimately with the Purified Talcum, allow it to stand for a week, if convenient, frequently shaking, then filter, and pass enough Stronger White Wine through the filter to restore the original volume.

Each fluidrachm represents 1 grain of Pepsin (*U. S. P.*).

451. VINUM PICIS.

Wine of Tar.

Tar, *one hundred grammes*	100 Gm.
Water, *two hundred and fifty cubic centimeters*	250 Cc.
Pumice, in moderately fine powder, *one hundred and twenty-five grammes*	125 Gm.
Stronger White Wine (F. 440), a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Upon the Tar contained in a suitable vessel pour *two hundred and fifty* (250) *cubic centimeters* of cold Water, and triturate the mixture thoroughly; then pour off the Water and throw it away. Mix the remaining Tar thoroughly with the powdered Pumice, and add *one thousand* (1000) *cubic centimeters* of Stronger White Wine. Stir frequently during four hours, then transfer the mixture to a wetted filter, and, after the liquid has passed, pour on enough Stronger White Wine to make the filtrate measure *one thousand* (1000) *cubic centimeters*.

452. VINUM PRUNI VIRGINIANÆ.

Wine of Wild Cherry.

Wild Cherry, in No. 40 powder, *two hundred and fifty grammes.*	250 Gm.
Sugar, *one hundred and sixty-five grammes*	165 Gm.
Water, *two hundred cubic centimeters*	200 Cc.
Alcohol, *seventy-five cubic centimeters*	75 Cc.
Purified Talcum (F. 395), *fifteen grammes*	15 Gm.
Angelica Wine, a sufficient quantity	
To make one thousand cubic centimeters	1000 Cc.

Dissolve the Sugar in the Water. Moisten the Wild Cherry with a sufficient quantity of this solution, and allow it to macerate during one hour. Then transfer it to a percolator, pour upon it the remainder of the solution, and afterwards enough Angelica Wine until *nine hundred* (900) *cubic centimeters* of percolate are obtained. Add to this the Alcohol, mix the Purified Talcum intimately with the liquid, then filter, returning the first portions of the filtrate until it runs through clear, and finally pass enough Angelica Wine through the filter, to make the product measure *one thousand* (1000) *cubic centimeters*.

Each fluidrachm represents 15 grains of Wild Cherry.

453. VINUM PRUNI VIRGINIANÆ FERRATUM.

Ferrated Wine of Wild Cherry.

Tincture of Citro-Chloride of Iron (F. 407), *eighty-five cubic centimeters*	85 Cc.
Wine of Wild Cherry (F. 452), enough to make *one thousand cubic centimeters*	1000 Cc.

Mix the Tincture with enough Wine of Wild Cherry to make *one thousand* (1000) *cubic centimeters.*

Each fluidrachm represents 5 minims of Tincture of Citro-Chloride of Iron and 13¾ grains of Wild Cherry.

454. VINUM RHEI.

(U. S. P., 1880.)

Wine of Rhubarb.

Rhubarb, in No. 30 powder, *one hundred grammes*	100 Gm.
Calamus, in No. 30 powder, *ten grammes*	10 Gm.
Stronger White Wine (F. 440), a sufficient quantity	
To make one thousand grammes	1000 Gm.

Moisten the mixed powders with *fifty* (50) *grammes* of Stronger White Wine, pack the mixture in a conical glass percolator, and gradually pour enough Stronger White Wine upon it to make the filtered liquid weigh *one thousand* (1000) *grammes.*

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The figures refer to the pages. To save unnecessary repetition of Latin and English titles, when these are practically identical, the several titles beginning with "Ceratum" and "Cerate," "Elixir" (Engl. "Elixir"), "Linimentum" and "Liniment," "Spiritus" and "Spirit," "Syrupus" and "Syrup," "Tinctura" and "Tincture" have been arranged, respectively, in *one* series. Under the list of Fluid Extracts, the word "Fluidum" has been abbreviated to "Fl."

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